Identifying Good Practice in the Provision of Climate Services for Farmers in Africa and South Asia

Background paper for the workshop: Scaling Up Climate Services for Farmers in Africa and South Asia, Senegal

10-12 December 2012

Edited by: Arame Tall, CCAFS/ICRISAT
Abstract

This white paper summarizes the lessons learnt from cases, projects and research experiments across Africa and South Asia effectively developing and providing climate information and advisory services for smallholder farmers. These projects have been selected as feature case studies for presentation and discussion during the CCAFS-WMO-USAID-CSP international workshop “Scaling Up Climate Services for Farmers in Africa and South Asia,” to be held December 10-12 in Senegal.

Two main case studies reaching farmers at scale are featured: Integrated Agrometeorological Advisory Services (IAAS) in India (which recently announced in 2012 plans to scale up to 10-12 million farmers) and Mali’s Projet d’Assistance Agrometeorologique au Monde Rural (which has provided innovative services to farmers since 1982). CCAFS and partners have conducted in-depth assessments of the Mali and India cases, in order to provide evidence of climate services use and benefit at the village level, and capture insights about factors that have contributed to their uptake, impact and sustainability at scale.

In addition, a dozen examples of less mature climate advisory service pilot cases from across Africa and South Asia are featured, to provide a solid evidence base for workshop discussions and follow-up actions.

Each case evidences one particular aspect of good practice, and exemplifies what it takes to reach remote and vulnerable farmers with salient, usable and timely climate information and advisory services, as well as the challenges remaining on the road to providing actionable climate services for smallholder farmers. The postulate is that such climate information and advisory services can effectively support farmer decision-making and risk management under a changing climate, improve agricultural productivity, and increase farmer incomes. The time is right for climate services to be scaled up to reach many more farmers struggling in the face of increasing climate uncertainty across Africa and South Asia.

This white paper will be circulated ahead of the December South-South learning workshop, as a synthesis document to stimulate, orient and set the agenda for discussion during the Workshop. Please refer to the Workshop Concept note for a full exposition of meeting objectives. Annexes to this document provide detailed case study summaries written by the lead organizations and researchers of each featured case study.

1 Introduction: Defining and Identifying Good Practice in Climate Services for Farmers

The main question that discussants and participants will address during the workshop is: “Based on your experience, what constitutes good practice in the production, communication and delivery of relevant climate services for farmers?”

Many challenges confront efforts to produce and deliver relevant climate-related information to improve the lives of smallholder farmers, including:

- **Delivery**: providing timely access to remote rural communities with marginal infrastructure.
• **Salience**: tailoring content, scale, format and lead-time to farm-level decision-making.
• **Legitimacy**: giving farmers an effective voice in the design and delivery of climate services.
• **Equity**: ensuring that women, poor and socially marginalized groups are served.

Several initiatives in sub-Saharan Africa and South Asia have used innovative approaches to overcome these challenges. Such efforts have intensified over the past decade, following climate scientists’ increased ability to model land-ocean teleconnections and the improved skill of climate forecasts, notably at the seasonal timescale. Warnings issued in advance of the 1997 El Niño event are a prime example.

Across Africa and South Asia, a few pioneering national agrometeorological advisory services reach a significant proportion of their farming populations on a sustained basis with information and advisory services. The two most prominent of these are India’s [Integrated Agrometeorological Advisory Services (IAAS)](https://www.ccas.org.in/) (which recently announced in 2012 plans to scale up to 10-12 million farmers) and Mali’s [Projet d’Assistance Agrometeorologique au Monde Rural](https://www.projetamur.org/) (which has provided innovative services to farmers since 1982). CCAFS and partners are conducting in-depth impact assessments of these two cases.

However, most initiatives that have grappled with the complexities of communicating and applying seasonal forecast information in Africa and South Asia have tended to be pilot-scale and project-based. Despite their experimental nature and limited scale, these pilot cases demonstrate good practice and provide valuable insights.

## 2 Case study selection

Case studies were selected from a roster of all recent and ongoing experiments providing climate and weather information and advisory services in Africa and South Asia, including agricultural advisory programs with a climate/weather advisory component.

In total, 16 cases studies were inventoried across Africa and South Asia:

- **Two (2) National agromet advisory programs**
- **Eleven (11) climate and weather information provision pilot projects, and**
- **Three (3) Agricultural advisory and extension projects with climate/weather components or modules.**

Based on this list, speakers and discussants were invited to present their work and pilot experiments in providing climate information and advisory services to farmers during the SS workshop. Table 1 displays the full roster of the 16 case studies identified, including the scope of each project and information on when the case will be discussed during the SS Workshop. A more detailed summary of main lessons learnt from each case study is provided in the Annex to this document.
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<thead>
<tr>
<th>Case Study</th>
<th>Features</th>
<th>Main Lesson</th>
<th>Agenda Item</th>
</tr>
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<tbody>
<tr>
<td><strong>1. National Agro-advisory Programs (reaching farmers at scale)- 2 cases</strong></td>
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<td><strong>Feature Presentation - Day 1</strong></td>
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<tr>
<td><strong>Region: South Asia</strong></td>
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<tr>
<td><strong>1. India’s Integrated Agro-Met Advisory Service (IAAS)</strong></td>
<td>Nation-wide provision of agro-met advisories, with:</td>
<td>Provision of farmer-focused climate services can be successfully done. However, it takes heavy investments into capacity development in both agricultural research centers and met services, at both national and decentralized levels.</td>
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<tr>
<td><strong>Duration</strong>: National program since 2008</td>
<td>- Successful integration of climate information and agricultural research to produce advisories</td>
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<tr>
<td><strong>World area covered</strong>: India</td>
<td>- Focus on farm-level decision needs</td>
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<tr>
<td><strong>Number of farmers touched</strong>: +3 million</td>
<td>- Capacity building of institutions to be able to produce forecasts</td>
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<tr>
<td><strong>Lead organization</strong>: India’s Meteorological Department (IMD)</td>
<td>- High resolution</td>
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<tr>
<td><strong>Partners in implementation</strong>: ICAR, State Agricultural Research Universities, Agricultural Extension Services, etc.</td>
<td>- Short Range weather forecasts as driver (5 days)</td>
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<tr>
<td><strong>Funded by</strong>: GoI</td>
<td>- Evaluation of provided services</td>
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<td></td>
<td>- Harmonized institutional framework for climate service provision that solidly rests on national institutions (brings in ag extension service, state ag. research universities)</td>
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<tr>
<td><strong>Region: West Africa</strong></td>
<td>-Bringing together multiple areas of expertise is important: Interpretation of forecast by multidisciplinary working group (the GTP, replicated at local levels) to produce agromet advisory.</td>
<td></td>
<td><strong>Feature Presentation - Day 1</strong></td>
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<tr>
<td><strong>2. Mali’s Agro-Met Advisory Program</strong></td>
<td>-Multi-disciplinary working group established with local level replicates. Functions of working group – identify farmers’ information needs, analyze technical aspects of data and products, develop recommendations related to agricultural production, disseminate info and build capacity.</td>
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<td><strong>Duration</strong>: 1982 – present</td>
<td>-Farmers supplied with rain gages and provide data to regional met offices. Farmers actively engaged and take part in reading gauges and interpreting information to produce their own forecast through the season.</td>
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<td><strong>World area covered</strong>: Mali</td>
<td>-Following end of Swiss support in 1995, project institutionalized into a national program operated by Meteo Mali.</td>
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<tr>
<td><strong>Number of farmers touched</strong>: Multiple</td>
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<tr>
<td><strong>Lead organization</strong>: Agence de la Meteo du Mali (METEO MALI)</td>
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<tr>
<td><strong>Partners in implementation</strong>: multiple</td>
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<tr>
<td><strong>Funded by</strong>: Swiss Development Agency until 1995, GoM from 1995</td>
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<tr>
<td><strong>2. Communicating Climate information to Farmers- Pilot experiments (non-mature, project-based pilot experiments)- 11 cases</strong></td>
<td>-Met service dissemination (10-day bulletins and 3-day forecasts).</td>
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<td></td>
<td>-Inclusion and active engagement of farmers in the forecasting process (through rain gages) is important to build a trust relationship.</td>
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<tr>
<td>Region: South Asia</td>
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<tr>
<td>1. Identifying farmer’s information needs to manage production risk in the Indo Gangetic Plains of India.</td>
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</tbody>
</table>
| • **Duration:** 2011-12  
• **World area covered:** Indo Gangetic Plains (IGP) of India—five states Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal  
• **Number of farmers touched:** 1200 farmers  
• **Lead organization:** CIMMYT  
• **Partners in implementation:**  
• **Funded by:** CCAFS |
| -Relevant and effective climate services have to begin by asking farmers: What information do you need to support your decision-making under a changing climate and improve your yields?  
- The three main components of any service delivery model ‘WWWH’—What to deliver? Whom to deliver, When to deliver and How to deliver?  
- In this case agri-information has to be delivered to the farmers using mobile phones. |

<table>
<thead>
<tr>
<th>Region: West Africa</th>
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<tbody>
<tr>
<td>2. Communicating Probabilistic seasonal forecasts to farmer groups (Kaffrine, Sénégal) &amp; Communicating short-range weather advisories to three target communities in Kaffrine (Sénégal)</td>
</tr>
</tbody>
</table>
| • **Duration:** 2011 - 2012  
• **World area covered:** Kaffrine  
• **Number of farmers touched:**  
• **Lead organization:** Agence Nationale de l’Aviation Civile et de la Meteorologie du Senegal (ANACIM)  
• **Partners in implementation:** Department of Agriculture, Agricultural Extension Services, World Vision, Red Cross Senegal, UK Met Office, HFP-King’s College London, University of Liverpool, University of Reading.  
• **Funded by:** CCAFS, Humanitarian Futures Program/King’s College London, CDKN. |
| -Seasonal Forecast communication with target farmers in Kaffrine, Senegal  
- Probabilistic scenarios  
- Use of agr. extension service  
- In 3 villages in Kaffrine, short range weather advisories (72h to 3hours) are communicated to farmers through the relay and constraints to information access, with the following appeals:  
  - Participatory identification of end user needs in climate/weather information + training on requested products  
  - SMS dissemination  
  - NGO with strong local feet as local relay  
  - Two way information transfer, with local communities playing key role in information production and feedback (community climate diaries, rain gage daily registered rainfall, dynamic tracking of actual weather events vs. forecast events)  
- Farmers can understand probabilities; the probabilistic nature of forecasts has to be shared with farmers.  
- Farmer communities need intra seasonal climate information as much as seasonal information, in order to reap the full benefits of available climate/weather forecasts.  
- Providing continuous weather forecasts across timescales (seamless forecasting) as a means to navigate uncertainty throughout the season.  
- Climate information however is not enough, needs overlay of agricultural extension experts’ interpretation of information to give context to received weather information and render it actionable (with concrete rural advisories on fertilizer use, pesticide application, seed selection, etc. in light of forecast).  
- Finally, more effort and work is needed to support farmers to adapt to the multiple envelopes of uncertainty inherent in the seasonal forecast, and enact contingency plans for multiple possible scenarios at the beginning of the season. |
<table>
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<tr>
<th>3. Gender-specific climate service needs among women farmer groups (Kaffrine, Sénégal)</th>
<th>Gender-specific climate service needs exist and need to be acknowledged, and catered to (communication channels, reach and inclusion)</th>
<th>WG #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Duration: 2011 - 2012</td>
<td>-Identification of specific needs for climate services of Women farmers in 3 villages in Kaffrine, and constraints to information access -SMS dissemination -Use of community relays (Red Cross)</td>
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<tr>
<td>- World area covered: Kaffrine</td>
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<tr>
<td>- Number of farmers touched:</td>
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<tr>
<td>- Lead organization: Agence Nationale de l’Aviation Civile et de la Meteorologie du Senegal (ANACIM)</td>
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<tr>
<td>- Partners in implementation: Red Cross Senegal, UK Met Office, HFP-King’s College London, University of Liverpool, University of Reading.</td>
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<td>- Funded by: CCAFS, Humanitarian Futures Program/King’s College London, CDKN.</td>
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<thead>
<tr>
<th>4. Climate Forecasting for Agricultural Resources - CFAR (Burkina Faso)</th>
<th>If appropriately communicated, seasonal climate forecasts can be understood and used beneficially by African farmers</th>
<th>WG #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Duration: 1998 – 2007</td>
<td>-Seasonal info produced by Burkina’s NHMS, translated by workshop facilitators and animators. Information focused on climate forecasts and agriculture production; format was highly interactive.</td>
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<tr>
<td>- World area covered: Burkina Faso</td>
<td>-Participatory meetings allowed for creation of information environment around forecasts.</td>
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<td>- Number of farmers touched: 160 directly –about 900 indirectly</td>
<td>-However, forecasts did not continue beyond project.</td>
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<td>- Lead organization: University of Georgia and Tufts U.</td>
<td>-Some of the best research yet on communication and use of seasonal forecasts</td>
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<tr>
<td>- Partners in implementation: Direction Générale de la Météorologie (DGM), Institute de l’Environnement et des Recherches Agricoles (INERA), Plan Burkina</td>
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<td>- Funded by: NOAA</td>
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<tr>
<th>5. GFCS Frameworks for Climate Services at the National Level</th>
<th>Appropriate Institutional frameworks are needed to enable the provision of salient agro-met advisory services to farmers. These institutional requisites are not to be overlooked in scaling up pilot experiments to nationally institutionalized national agromet advisory programs.</th>
<th>WG #1</th>
</tr>
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<tbody>
<tr>
<td>- Duration: July-September 2012</td>
<td>Testing of new methodology to bring together National forecasters, agricultural research institutions and national decision-makers, boundary organizations and end-users (representatives of the user community), with promising results from Mali, Burkina Faso and Niger.</td>
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<tr>
<td>- World area covered: West Africa</td>
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<tr>
<td>- Number of farmers touched: n/a</td>
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<tr>
<td>- Lead Organization: WMO</td>
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<tr>
<td>- Partners in implementation: NHMS of Burkina Faso, Mali and Niger</td>
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<tr>
<td>Region: East Africa</td>
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<tr>
<td><strong>Duration:</strong> 2011 - 2012</td>
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<td><strong>World area covered:</strong> Wote, Kenya</td>
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<tr>
<td><strong>Number of farmers touched:</strong> 600</td>
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<tr>
<td><strong>Lead organization:</strong> ICRAF/ICRISAT</td>
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<tr>
<td><strong>Partners in implementation:</strong> KARI, multiple</td>
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<tr>
<td><strong>Funded by:</strong> CCAFS</td>
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<tr>
<td>- Communication of seasonal agro-met advisory bulletins in English and local language (Kikamba) to rural farmer groups to advise farm decisions on crop selection, land allocation, preparing for seasonal investments based seasonal forecast information.</td>
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<tr>
<td>- Value-addition to produce downscaled seasonal forecast relevant for target location.</td>
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<td>- Use of rural radio to disseminate agro-met advisory.</td>
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<td>- Information shared as part of a training workshop on CC / variability and probabilistic forecast information interpretation to strengthen farmer capacity to understand and utilize advisories.</td>
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<td>- 4 groups received treatment: workshop training, agro-advisory, workshop training and agro-advisory, control group.</td>
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<tr>
<td>- Results show higher yields for farmers who received the agro-met advisory alone, but farmers who received workshop training + advisory were more willing to pay to receive agro-climate advisories compared to any other group.</td>
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<tr>
<td>- Climate information can play an important role in helping farmers better understand climate variability and associated risks, and in enhancing their decision-making for effective risk management.</td>
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<td>- Value-addition &amp; locally specific climate services are important to render forecasts salient to inform farm practices and decisions.</td>
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<td>- Seasonal forecasts are relatively skilful in East Africa region</td>
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<p>| <strong>7. Providing Climate Services at Grass-root level in Ethiopia: Training of Trainers on Weather and Climate Information and Products for Agricultural Extension Services in Ethiopia</strong> |
| <strong>Duration:</strong> Jan 2010 – present  |
| <strong>World area covered:</strong> Ethiopia  |
| <strong>Number of farmers touched:</strong> More than 780 (direct)  |
| <strong>Lead Organization:</strong> Ethiopia’s National Meteorological Agency (NMA)  |
| <strong>Partners in implementation:</strong> Ministry of Agriculture and Rural Extension Service, World Food Programme, AGRA, Working closely with the farmers is important to successfully service their information needs and support adaptation and food security |
| - Working closely with farmers on the benefit of agro-meteorological early warning as agricultural decision tools  |
| - Use of plastic rain gauges for monitoring the progress of rainy season and making decisions at the farm level  |
| - Creates user-producer interface between meteorological services and agricultural community on the exchange and use of real-time and forecasted weather/climate information towards the creation of food sufficient society in Ethiopia.  |</p>
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Duration</th>
<th>World Area Covered</th>
<th>Number of Farmers Touched</th>
<th>Lead Organization</th>
<th>Partners in Implementation</th>
<th>Funded by</th>
<th>Description</th>
<th>Session Chair</th>
</tr>
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<tbody>
<tr>
<td><strong>8. Dissemination of Weather and Climate Information in Local Languages Initiative - Uganda</strong></td>
<td>2013 -2015</td>
<td>Uganda</td>
<td>-</td>
<td>Farmers Media Link Centre</td>
<td>National Agriculture Research Organization, District Local Governments, NGOs, Media Houses, Makerere University, Local and International Organizations Partners, Farming Groups, Schools, Village savings and Credit Groups(Village Banks) and Faith Based Organizations</td>
<td>Rockefeller Foundation</td>
<td>The dissemination of weather and climate information in local languages initiative in Uganda is a unique approach that centers on enhancing the understanding and timely delivery of climate information to rural farming communities using a variety of dissemination channels. The Farmers Media Link Centre and the Department of Meteorology together with support from collaborating partners is translating and disseminating Seasonal Climate Forecasts to farmers in Uganda in several local languages. These languages are Luganda, Lusoga, Runyankore, Rukiga, Runyoro, Rutoro, Luo, Lugbara, Ateso, Japadhola and Akarimojong. The dissemination of these forecasts to farmers is throughout the country covering most of the districts in Uganda.</td>
<td>WG #2</td>
</tr>
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</table>
-Partnership between the meteorological services of Kenya and traditional climate forecasters to co-produce seasonal climate forecasts that are then disseminated by the traditional forecasters in forums they normally use for information dissemination such as village meetings (Ziervogel & Opere, 2010). 
-Production and translation is a collaboration between scientists and traditional forecasters. | WG #3         |
| **10. Promoting Integration of Indigenous Knowledge and Scientific weather and climate forecasting for risk management under a changing climate in Lushoto District, Tanzania.** | -                | -                 | -                        | -                                                                                         | -                                                                           | -                                                                                           | -                                                                                                                                         | WG #3         |
### Indigenous Knowledge Bank

| Duration: | 2 years |
| World area covered: | Africa |
| Number of farmers touched: | |
| Lead organization: | ENDA “Energy, Environment, Development” |
| Partners in implementation: | UNITAR |
| Funded by: | Co-financed by the European Commission, Austrian Development Cooperation and Switzerland Government. |

- Repertoire of Traditional indicators for seasonal forecast and prediction. With the community we have identified indicators of seasonal trends: quality and quantity of rain for sowing “Thiebo,” and predictions of the end of the season. These indicators can be astral, vegetal, animal and physical.

- Examples of Astral Indicators: Observation of clouds/stars having the shape of an elephant, when clouds after having black colour become whitish on short intervals

- Examples of Plant Indicators: flowering of many species of trees such as the Néré, dimb, tamarind, baobab - those trees become leafy when the rainy season draws near

- Examples of Animal Indicators: songs of a bird that call men to go to the fields and ask women to stay at home; reproduction of grey lizards (as they must lay their eggs in water); Appearance of butterflies; Type of building done by ants

- Examples of Physical Indicators: Wind changes direction / wind that brings rain; Temperature increases.

Indigenous Knowledge plays a great role on community livelihoods. The progressive loss of Traditional Knowledge is a threat to effective farmer adaptation and Climate Risk Management.

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1. Communicating Agricultural information to support farmer decision-making, including climate information – Pilot experiments - 5 cases
*Climate information provided in the context of a larger effort to provide farmers with access to a diversity of agricultural information.*

### Region: West Africa

1. **Results of the MetAgri Project: WMO Roving Climate Seminars**
   - **Duration:** 2008-Current
   - **World area covered:** Western Africa (15 countries)
   - **Number of farmers participated (2008-2011):** 7300 (1000 women)
   - **Lead organization:** World Meteorological Organization
   - **Partners in implementation:** National Meteorological Services. Benin, Burkina Faso, Cape Vert, Côte d’Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal and Togo
   - **Funded by:** AEMET (Spanish Meteorological Agency) 2008-2011, Norwegian Ministry of Foreign Affairs (2012-2014).

   WMO is promoting the organization of a series of one-day Roving Seminars on Weather, Climate and Farmers in different regions of the world to sensitize them about the weather and climate information and it’s applications in operational farm management. Also, these seminars will increase the interaction between the local farming communities and the local staff of the National Meteorological and Hydrological Services (NMHSs). This feedback is crucial for the NMHSs in providing better services for the agricultural community. [http://www.wmo.int/pages/prog/wcp/agm/roving_seminars/index_en.html](http://www.wmo.int/pages/prog/wcp/agm/roving_seminars/index_en.html)

   The value of dialogue between information providers and users of that information

### Region: East Africa

2. **Grameen Community Knowledge Workers Program (Uganda)**
   - **Duration:** Nov 2011 - Dec 2012
   - **World area covered:** Kasese District, South western Uganda
   - **Number of farmers touched:** 12,561 Farmers registered in Kasese District to receive 10-day, Monthly and Seasonal weather forecasts on their Mobile Phones via sms, Community Knowledge workers provided total of over 16,000 Weather Information services to farmers through the use of App enabled Smart Phones
   - **Lead organization:** WMO
   - **Partners in implementation:** Grameen Foundation, Uganda Department of Meteorology, Grameen Foundation; Ministry of Water, Lands & Environment (Department of Meteorology); National

   Mobile applications that serve the needs of poor and other vulnerable individuals and communities, most of whom have limited access to information and communications technology, and alleviate some of the information and access to markets barriers for the poor, especially those in rural areas.

   - Google SMS mobile services bundle allows user to query and access content on a range of topics like sports scores, local news, health and agriculture tips, etc, and Google Trader, SMS-based "marketplace" application. A Village Phone Operator is present as entrepreneur. Information automatically provided in response to an SMS query. Five mobile applications - Farmer’s Friend, searchable database with agricultural advice and targeted weather forecasts; Health Tips for sexual and reproductive health; Clinic Directory for nearby clinics; Google Trader matches agriculture buyers and sellers, and other

   Mobile phones have proven an effective channel of communication with farmers due to the high penetration levels to areas that wouldn’t have been reached by traditional extension workers. Leveraging technology is a good model

   Grameen: You need information, to complement access to finance. How do you enable hundreds/millions to access information? Mobile phones/technology!
### 3. The African Farm Radio Research Initiative (AFRRRI)

**Duration:** 42 months  
**World area covered:** 5 countries in Africa, Tanzania, Uganda, Kenya, Malawi, Ghana and Mali  
**Number of farmers touched:** 40 million  
**Lead organization:** Farm Radio International (FRI) in collaboration with World University Service of Canada (WUSC)  
**Partners in implementation:** Farmers, Agricultural knowledge partners, Radio Stations, Ministries of agriculture, Extension services, other development actors in the countries  
**Funded by:** Bill & Melinda Gates Foundation

- Strengthening the capacity of rural radios to package and communicate climate services for farmers.  
- Working with 5 radio stations in Ghana (Classic FM, Volta Star, Radio Ada, Radio Simli, Radio Afram Plains). Programming introduces one new agricultural product that is known to contribute both to household nutrition and household income, new land use measures that are known to conserve or improve the quality of farm soils (e.g. contour ploughing, mulching, agroforestry), measures that have been proven to reduce post-harvest losses. Farmers reached through Radio broadcasts; interactive radio via phone-in shows, live community forums, radio diaries.  
- Rural radio, when focus is on production and translation to best serve farmers, can serve as an effective means to reach rural farming households and support them to meet their food security objectives in Africa.  
- Participatory Radio Campaigns provide low cost and effective agricultural information services which inspire farmers to try out improved practices.  
  - Important pitfalls are to be heeded however to successfully use Rural radio, including the extent to which radio stations are already listened to and trusted by the targeted beneficiaries; the complexity or difficulty of adopting the improvement on the part of the target audience; and the availability of good extension support to support the adoption of the practice.

### 4. Developing approaches to support smallholder decision making and planning through the use of: historical climate information; forecasts; and participatory planning methods

**Duration:** Nov 2011–Jan 2013  
**Area:** Zimbabwe & Tanzania to date. Future work in Kenya & West Africa  
**No. of farmers touched:** Tanzania (pilot) 250 so far; Zimbabwe 2,300 so far  
**Lead organization:** University of

- Analysed historical climate data for sites completed to data provide surprising & important findings. Main findings that are generally consistent across sites analysed to date:  
  - Temperature is increasing  
  - There are no discernible trends in rainfall season totals, start / end dates, distribution in season, dry spells, rainfall events  
  - This is important as if climate change is understood to be the main cause of reduced yields (when in many areas it may be due more to other factors e.g. declining soil fertility), farmers &
Reading, UK.

- **Partners in implementation:** Practical Action; AGRITEX (Zimbabwe); Tanzania Met Authority; Agricultural Research Institute (Tanzania)
- **Funded by:** Nuffield Foundation (Zimbabwe); CCAFS (Tanzania)

Support agencies may promote inappropriate strategies.

- Farmers found participatory planning methods extremely useful to identify & compare different crop management and livelihood options they could use for the next season(s). Finally, farmers found analysed information very useful for decisions – e.g. rainfall, season lengths.

- Farmers want results from historical met. data & forecasts, together with tools to help their planning & decision making. Approaches that can achieve this are needed

### 5. Climate Learning for African Agriculture (CLAA)

- **Duration:** September 2011 to August 2013
- **World area covered:** Africa regionally, with case studies in Sierra Leone, Benin, Uganda and Mozambique
- **Number of farmers touched:** n/a
- **Lead organization:** Natural Resources Institute, University of Greenwich
- **Partners in implementation:** Forum for Agricultural Research in Africa, African network for Agricultural Advisory Services
- **Funded by:** Climate and Development Knowledge Network

Agricultural research and advisory services have great potential to support climate adaptation, but the question of how to do this must be framed broadly, taking in “high-level” issues of climate policy, as well as “grassroots” issues of how and why to facilitate farmer participation.

WG #5
3 Key Good Practice Themes to Provide Climate Services for Farmers

The various lessons learnt from across the India and Mali national programs and pilot experiments in reaching farmers with climate services display multiple overlaps. Across all featured cases, a number of key good practice themes emanate. These themes, proposed as a template for discussion during the SS Workshop, are as follows:

**Good Practice Theme #1. Bridging the Gap between Climate Forecasters and Agricultural Research:** How to produce salient, downscaled and decision-relevant climate information for farmers? *(i.e., Integration of hydrometeorological and agricultural information to produce rural agro-met advisory, needed Institutional partnerships, forecast downscaling & value addition at local levels).*

**Good Practice Theme #2. Reaching the "last mile" at scale:** What are effective pathways for reaching hundreds of rural farmers with tailored climate services? Who are legitimate messengers? What are challenges to upscaling and successful models for doing so? *(i.e. partnering with agricultural extension, NGOs/CBOs and community relays, rural radio, ICTs, etc.).*

**Good Practice Theme #3. Giving Farmers a Voice:** How to empower farmer input into climate service development? Building a two-way communication system within the cycle of Climate Service Development? *(i.e., integrating climate information with indigenous/local knowledge to produce locally relevant climate services)*

**Good Practice Theme #4. Equitable climate information and advisory services:** How to ensure that climate services reach women and other socially- and economically-marginalized groups?

**Good Practice Theme #5. Is information enough?** How to integrate information with other interventions to enable farmers to reap the full benefits from early climate information and support effective management of climate-related risk at the farm level?

Together, these five good practice themes appear to constitute the cornerstones of all successful climate service projects or programs. Which specific good practices under each theme have been particularly successful? What are challenges to implementing / scaling up recommended good practices?

During one full half day, working groups will respond to these specific questions and dissect each Good Practice Theme, to reveal key good practices in attempting to reach farmers at scale with salient climate services.

4 Working Groups to Identify Good Practices in Climate Service Provision for Farmers

During the SS workshop, five Working Groups (WGs) will be convened to discuss each Good Practice Theme (GPT).

During each WG session, a number of case studies will be presented to stimulate discussion around the GPT and begin a dialogue to identify meaningful good practices that deserve to be scaled up world-over, to enable farmers to access relevant climate information and
advisory services, and improve their ability to face a changing climate while increasing productivity and incomes.

Across all WGs, workshop participants will be asked to answer the following specific questions:

• **Identify what constitutes good practices under each theme: What is good practice for...?**
• **Challenges to scaling up identified good practice**
• **Recommendations for scaling up good practices within country and across regions**

The section below provides an overview of the case studies that will be presented under each GPT.

**Good Practice Theme #1. Bridging the Gap between Climate Forecasters and Agricultural Research:** How to produce salient, downscaled and decision-relevant climate information for farmers? *(i.e., integration of hydrometeorological and agricultural information to produce rural agro-met advisory, needed institutional partnerships, forecast downscaling & value addition at local levels).*

Featured Case studies 1-3 under Theme #1 will be:

1) **Wote (Kenya): Communicating downscaled probabilistic seasonal forecast information to farmer groups- Communication and Downscaling methods.** Case presenter: Dr. KPC Rao

2) **Kaffrine (Senegal): Communicating downscaled probabilistic seasonal forecast information to farmer groups- Communication and Downscaling Best practices.** Case presenter: Dr. Ousmane Ndiaye

3) **GFCS Frameworks for Climate Services at the National Level: Bringing Forecasters and users together around the priority needs of community end-users- Lessons from pilot West Africa experiences.** Case presenter: Kaliba Konare / Filipe Lucio (TBC)

**Good Practice Theme #2. Reaching the "last mile" at scale:** What are effective pathways for reaching hundreds of rural farmers with tailored climate services? Who are legitimate messengers? What are challenges to up-scaling and successful models for doing so? *(i.e., partnering with agricultural extension, NGOs/CBOs and community relays, rural radio, ICTs, etc.)*

Featured Case studies 4-6 under Theme #2 are:

4) **Grameen Uganda SMS-based farmer advisory delivery.** Case Presenters: Gilbert Agaba (Grameen Uganda AppLab) / Deus Bamanya (Uganda NHMS)

5) **Farm Radio International: Building the Capacity of rural radios to package and communicate climate information to farmers.** Case Presenters: Margaret Kingamkono (Farm Radio International)

6) **Dissemination of Weather and Climate Information in Local Languages.** Case Presenters: Patrick Luganda (Farmers Media Link, Uganda)

**Good Practice Theme #3. Giving Farmers a Voice in Climate Service Production:** How to empower farmer input into climate service development? Building a two-way communication system within the cycle of climate service development? *(i.e. integrating
climate information with indigenous/local knowledge to produce locally relevant climate services)

Featured studies 7 – 10 under Theme #3:

7) Identifying farmer’s information needs to manage production risk in the Indo Gangetic Plains of India. Case Presenters: Surhabi Mittal (CIMMYT)
8) Integrating Indigenous Knowledge in Climate Risk Management in support of Community Based Adaptation project in Nyangi Community (Kenya). Case Presenters: Laban Ogallo (ICPAC) / Kenya Meteorological Department (KMD)
9) Integrating Indigenous Knowledge with Seasonal Climate Forecasts in Lushoto (Tanzania). End user-specific needs in climate service provision in Kaffrine (Senegal). Case Presenters: Prof. Mahoo (Sokoine University) / Tanzania Meteorological Agency (TMA)

Good Practice Theme #4. Equitable climate information and advisory services: How to ensure that climate services reach women and other socially- and economically-marginalized groups?

Featured Case studies 11-12 under Theme #4:

11) Demonstrating the Value of Climate Services in Senegal and Kenya: Results of ANACIM-Red Cross collaboration to communicate short-range weather advisories to women in three rural communities: Identification of Gender-specific needs in climate service provision in Kaffrine (Senegal). Case Presenters: Mara Laye (Senegal Red Cross) / Soxna Diouf (model farmer, Dioly village, Kaffrine)
12) Rockefeller Regional Project on Agro-met advisory to farmers- Ethiopia results. Case Presenters: Atos Derecha and Hailemariam (Ethiopia Met Service Agromet department).

Good Practice Theme #5. Is information enough? Integrating information with other interventions to enable farmers to reap the full benefits from early climate information and support effective management of climate-related risk at the farm level.

Featured studies 12-15 under Theme #5:

13) Results of the MetAgri Project: WMO Roving seminars. Case Presenter: Jose Camachos (WMO)
14) Climate Forecasting for Agricultural Ressources (CFAR) project- Burkina Faso: lessons learnt and challenges to replicability? Case Presenters: Carla Roncoli (Emory U.) / Judy Sanfo (Burkina NHMS)
15) Results of the Climate Learning for African Agriculture (CLAA) – CDKN project. Case Presenter: John Morton (NRI)

5 Conclusions: Identifying Good Practice in Climate Service Provision for Farmers

This initial scoping paper identifies efforts to provide farmers with climate services that are ongoing across Africa and South Asia. These experiences, to be discussed in depth at the
workshop, provide rich examples of the expanding effort to support farm level adaptations to a changing climate.

The SS workshop will offer a privileged platform to identify and inventory good practice in the production, communication and delivery of decision-relevant climate services for farmers. Although initiatives that have grappled with the complexities of communicating and applying seasonal forecast information in Africa and South Asia have tended to be pilot-scale and project-based, they demonstrate good practice and provide valuable insights. The time is right to learn from and build on examples of good practice in farmer-focused climate information and advisory services, and to share elements of good practice between Africa and South Asia.
ANNEXES: SUMMARY OF LESSONS LEARNT FROM FEATURED CASE STUDIES

I. India’s Integrated Agro-Met Advisory Service (IAAS)

Please see the India case study, attached as a separate document.

II. Mali Agromet

Please see the Mali case study, attached as a separate document.

III. Individual case studies

Case Studies Under Good Practice Theme #1. Bridging the Gap between Climate Forecasters and Agricultural Research:

Theme 1 Case Study #1: Wote, Kenya: Communicating downscaled probabilistic seasonal forecast information to farmer groups—Communication and Downscaling Methods.

Duration: 2011-2012
World area covered: Eastern Kenya
Number of farmers touched: 600
Lead organization: ICRISAT
Partners in implementation: IRI, KARI, KMD, MoA-Kenya
Funded by: CCAFS

Most important lesson learnt: “Climate information can play an important role in helping farmers better understand the variability and associated risks, and in enhancing their decision-making for effective risk management”

1. Introduction / Background

a. Rationale

One of the major constraints faced by smallholder farmers in semi-arid environments is coping with production uncertainties associated with unpredictable seasonal conditions. The risk associated with the variability in rainfall coupled with the generally risk averse nature of smallholder farmers acts as a major disincentive to investment in improved technologies. As a result farmers continue to use low input agriculture aimed at minimizing use of external inputs such as fertilizer to reduce risk. Since many farm management decisions (e.g., which crop to grow on how much area and under what management conditions) are made without knowledge of anticipated weather conditions during the crop growth period, it is hypothesized that advance information about the possible seasonal conditions in the form of seasonal climate forecasts will help farmers in making more informed decisions by reducing the risk of investing in inputs that can improve the
productivity and profitability of their farms. In general, the climate over East Africa has fairly good predictability due to the strong influence of the ENSO cycle. Many national and international meteorological organizations regularly issue seasonal climate forecasts for the region. However, use of seasonal climate forecasts in agricultural decision-making by smallholder farmers is limited. Lack of farmer understanding of the probabilistic nature of forecasts is a major barrier to farmers being able to use seasonal climate forecast information.

b. Objectives

This study will evaluate alternative methods of presenting climate information, including seasonal climate forecasts, in a format that farmers can readily understand and make use of it with the following objectives:

- Test and refine the design of downscaled, probabilistic seasonal forecast information, and forecast-based management advisories;
- Test and refine a workshop-based process for training farmers to understand and apply probabilistic seasonal forecast information;
- Evaluate the impact of seasonal forecast products and training, and forecast-based management advisories on farmers’ management decisions; and
- Elicit farmers’ perceptions of the seasonal forecast products, advisories and communication process; and their management responses to the information.

c. Anticipated outcomes

- Improved understanding about the role and potential contribution of climate information in reducing risk, promoting investment and improving productivity of smallholder farms
- Reduced risk, increased productivity and profitability through forecast based planning and management of farms by smallholder farmers
- Well tested training modules aimed at improving knowledge and understanding about climate variability, probabilistic forecasts and potential role of forecasts in improving smallholder agriculture
- Efficient formats and communication channels for presenting seasonal climate forecast information to farmers and extension agents

2. Methods brief

The study was initially conducted in Wote division, Makueni County, Kenya during the 2011 short rain season and extended to Kaiti division in the same county during the 2012 short rain season. The study was designed to evaluate the effectiveness of two different methods of presenting downscaled probabilistic seasonal climate forecast information to smallholder farmers against a control with no intervention. The methods include a two-day training workshop for farmers with instruction in probability theory and its implications in decision-making, and the presentation and interpretation of seasonal forecast information and its agricultural significance in the form of an agro-advisory.
Treatment effectiveness was assessed by collecting data on crops, varieties, and management practices initially planned, practices that were actually implemented during the season, and the outcome of the practices implemented through three different surveys conducted during the period of experimentation. A pre-season survey conducted in September 2011, a month before the start of the season, was aimed at capturing the expectations and plans that the farmers had for the season prior to the provision of forecast information. A mid-season survey was conducted in February 2012 to document the crops, varieties and management practices that are actually adopted by the farmers. The end-of-season survey was conducted in May 2012 to capture the outcome of the various practices adopted by the farmers.

Of the 117 farmers who initially participated in the study, 107 were available for mid-season survey while 111 participated in the end season survey.

3. Results to Date:

Emphasize Livelihood Impacts and stories of behavioural change from having received a given treatment

The findings of this study have clearly indicated that forecast information when presented appropriately can contribute to a significant change in how smallholder farmers operating in high risk environments plan and manage their farms. The evidence collected suggests that farmers understood and utilised the probabilistic seasonal climate forecast information by making adjustments to their plans, and ultimately benefited significantly. Important messages emanating from this study are:

a. Farmers are generally optimistic in their expectations about the coming season but tend to be conservative when making actual investments mainly due to lack of good understanding about the risks associated with those investments and high risk perception
b. As evidenced by the differences in the way farmers in control and treatment villages managed their farms, farmers tend to adopt risk coping strategies such as cropping more area and using drought tolerant crops rather than investing in improved management of crops
c. Improved understanding of climate variability and seasonal climate forecast information provided a basis for farmers to plan and implement strategies that can contribute to increased productivity and profitability
d. Though farmers in this area have access to climate information, their lack of understanding of the forecast information and uncertainties associated with it lead to low levels of use. The training and support received by farmers during this study helped them to better understand the potential value of this information and make use of it.
e. A certain change in the attitude of farmers about climate is evident. Farmers who went through the training were found to be more realistic in their assessment of the season and more satisfied with the outcome of their management choices.
f. Farmers have shown keen interest in receiving climate information and have favourable perceptions of the value of this information in planning farm operations, indicated by their willingness to pay for the service.
g. No major differences were observed in the way men and women responded to climate information.
4. Lessons Learnt

A good understanding of the risks and opportunities associated with variable climatic conditions is extremely important in efficient planning and management of farm activities by smallholder farmers. With a good understanding of the historical and current climatic conditions including climate forecasts, it is possible to tailor the management of agricultural systems in a way that capitalizes on opportunities and minimizes risks. While farmers have developed a good understanding about the climate variability at their locations through observation, experimentation, and practice, there are inherent difficulties in judging risk in complex systems. The inherent problem of separating climate impacts from other drivers affecting agricultural production complicates the process of accurately perceiving risks and making decisions accordingly. Since farmers base decisions based on their perceptions, efforts to assist farmers in adapting to climate variability and change must place the perceptions, experiences and actuality of changes in climate in the context of the impacts of various drivers on the performance of agriculture. The training program developed is very effective in addressing these challenges and in promoting use of forecast information.

Theme 1 Case Study #2: Kaffrine, Senegal: Communicating downscaled probabilistic seasonal forecast information to farmer groups—Communication and Downscaling Best Practices

**Duration:** 2011-2012  
**Area covered:** Kaffrine  
**Number of farmers touched:**  
**Leader organizations:** Agence Nationale de l’Aviation Civile et de la Meteorologie du Senegal (ANACIM)  
**Partners in implementation:** Department of Agriculture, Agricultural Extension Services, World Vision, Red Cross Senegal, UK Met Office, HFP-King’s College London, University of Liverpool, University of Reading  
**Funded by:** CCAFS, Humanitarian Futures  
**Most important lessons learnt:**

1. **Introduction/Background**

The Sahel region has the strongest year-to-year seasonal rainfall variability. In most of these countries 80% of the agriculture is rainfed so climate is a food security issue. The project started in Kaffrine, located in the peanut basin of Senegal where agriculture is the primary source of income and employs 90% of the population. After a year of success in training and communicating the seasonal total forecast in 2011, the project was extended to the whole region of Kaffrine. Farmer demand was strong for rainy season onset and weather forecasts from 1 to 5 days with nowcasting of 30mm to 1 hour ahead. Growing from 33 farmers in 6 villages in 2011, the network reached 123 farmers located in various locations spanning the whole region outreaching more than 1000s through SMS, local radio, meetings and TV. This is a pluridisciplinary approach at two levels: national (mainly national institutions located in Dakar) and local (extension services in Kaffrine). The partners included the national weather service (ANACIM), volunteers from World Vision and Red Cross, agricultural advisers (ANCAR), department of agriculture (DA), national agricultural research institute (ISRA), management of Water resources (DGPRE), NGOs (ENDA-energy) and at the local
level farmers group (Women producers), seed producers, and extensions services. All activities are funded by CCAFS and included a training workshop, field visits, and evaluation. This project fosters dialogue between producers and users of climate information around key products needed to secure food security. A first evaluation revealed that farmers are now demanding climate information products and rely heavily on them in decision-making on planting dates, crop choices, and investment in inputs.

a. Rationale

Seasonal climate forecasts could have considerable potential to improve agricultural management and livelihoods for smallholder farmers in the Sahel. But benefits are limited by many constraints related to the capacity to respond to forecast information, data scarcities, inadequate information services, and policies or institutional processes in the region. However, great potential exists for overcoming these challenges.

b. Objectives

Although agriculture and pastoralism employs 80 percent of the population in the Sahel, climate information is not yet widely integrated into farm management decision systems. The objective of this project is to foster dialogue between farmers and producers of climate information in order to provide tailored products that will help increase food insecurity.

c. Anticipated outcomes

A big challenge in this project was to go through many key and important steps in achieving good Climate Risk Management (CRM), including producing skilful seasonal forecasts at the district level, the translation of probabilistic seasonal forecasts into easy-to-understand terminology, and training farmers with this new information its potential use in decision-making.

2. Methods brief

To achieve our goals we took several steps.

2.1 Building trust:

The project sought to build the trust of farmers, while working with all relevant local organizations. It was very important that the project team not appear as a stranger in the system, but work through known entities. We worked with local technical services including agricultural advisers from the national agency for agricultural and rural advice (ANCAR), which has a presence nationwide at the district level and a mandate to advise farmers on agricultural strategies, and with volunteers from World Vision, a Christian charity organization. Participants included individual farmers and members of farmer organizations such as JAPPANDO. Women represented about 30 per cent of those participating.

2.2 Connecting with farmers through indigenous knowledge:

There was a clear need for a common ground, where farmers would readily accept a new scientific seasonal forecasting approach without feeling that their indigenous approaches to
seasonal forecasting were being rejected. The strategy was to listen to them and understand the aspects of their traditional knowledge that might be climate related. The farmers were welcomed as guardians of knowledge passed from generation to generation, and invited as experts to share their indigenous climate knowledge.

2.3 Training:

Another challenge was how to explain to farmers that rainfall could be predicted one to two months ahead and to help them to understand the probabilistic nature of forecasts at this lead-time, in easy-to-understand terms. Many farmers knew about weather forecasts, communicated through the weather bulletin on national TV. Seasonal forecasting was explained to the farmers by calling upon their intuition. It was explained that ocean has better memory of the past compared to the continent. That's why, on a very hot day people go to the beach to benefit from ocean memory of the past weeks.

Assessment of the approach:

An evaluation workshop was organized in Kaffrine to assess the use and usefulness of the seasonal forecast strategy. Fifteen trained farmers were compared to thirteen other farmers who hadn't received information about seasonal forecasting. Trained farmers used a short cycle crop because the rainy season was expected to be less than the previous year, but rainfall would be enough.

Those who had never received any climate information planned according to last year's rain by choosing a long cycle variety, buying fertilizers and hiring wage laborers.

Some trained farmers were not able to use the seasonal forecast because they had saved their seeds from the previous year's harvest.

Challenges:

The main problems encountered were the high spatial variability of the rainfall; the late occurrence of the first rainfall which made it difficult to judge when to start planting; a long dry spell; and early termination of the season. Farmers were interested in onset date forecasts, forecasts at a finer spatial scale, a weather bulletin each two weeks, and more training to better understand the forecast.

Additional Material:
http://ccafs.cgiar.org/blog/putting-climate-forecasts-farmers-hands
http://ccafs.cgiar.org/blog/following-last-year%E2%80%99s-climate-forecast-workshop-%E2%80%93-what-happened-next

Theme 1 Case Study #3: West Africa: GFCS Frameworks for Climate Services at the national level: bringing forecasters and users together around the priority needs of community end-users—Lessons from pilot West Africa experiences
**Most important Lesson learnt from your project:** Appropriate Institutional frameworks are needed to enable the provision of salient agro-met advisories to farmers. These institutional requisites are not to be overlooked in scaling up pilot experiments to nationally institutionalized national agromet advisory programs.

1. **Introduction / Background**

The Objective of this pilot initiative was the testing of new methodology to bring together National forecasters, agricultural research institutions and national decision-makers, boundary organizations and end-users (representatives of the user community), with promising results from Mali, Burkina Faso and Niger.

In July 2012, the Global Framework for Climate Services (GFCS) piloted three important activities to build the user interface platform (UIP) where such platforms are most critically needed: at the national level.

Thus, the three Meteorological Offices of Burkina Faso, Niger and Mali were supported to carry out their own stakeholder mapping at the national level and reach out to key stakeholders across all climate-sensitive sectors in the country (health, agriculture & food security, disaster management, water, infrastructure, transport and energy), potential users of their climate and weather products. A National Workshop on Climate Services in each pilot country followed to launch the dialogue between national providers and users of climate services, and discuss the appropriate institutional mechanisms for establishing a perennial National Framework for Climate Services.

2. **Methods brief**

The national workshops of Burkina, Niger and Mali brought together national Met service staff and climate researchers with over fifty representatives from climate-sensitive sectors in each country, as well as vulnerable community spokespersons and representatives from boundary organizations (communicators, rural radios, farmer platforms, community-based organizations, and so forth), adept community relays of climate and weather advisories and alerts.

Participants in all three national workshops were tasked with defining and jointly agreeing on a plan of action to communicate timely, salient and actionable early warnings to populations in communities at risk from predictable climate hazards, in order to enable climate information access and utilization by these populations. On one end of the dialogue table were representatives of the national climate science community, all-knowing scientists directly involved in producing climate and meteorological forecasts. These included forecasters from national hydro-meteorological services (NHMSs), climate modelers from the national university laboratories, hydrologists, remote sensing experts
and agro-meteorologists who had for the large majority, however, never reached out in their life to users who did not understand a word of their scientific jargon (people who did not know what convection was, had never heard of El Nino). Facing them at the other end of the table were representatives from a selected community at risk in the country affected by yearly predictable hazards, as well as government planners and boundary organizations able to serve as relays of meteorological/climate information to communities at risk.

The participatory method for climate science communication constituted the cornerstone of the workshop and set the stage for the ensuing gap bridging exercises.

![Diagram of participatory method for climate science communication](image)

**Fig. 1:** The participatory method for climate science communication illustrated. Workshops display one scientist with 5-6 end-users per module table. End-users turn from module table to table in the morning; in the afternoon scientists turn to each end-user group's table.

3. **Results**

What came of these interactions were clear user-devised roadmaps to build National Frameworks for Climate Services, and establish an effective chain of information that would
link available climate science and early warning information with technical services of all climate-sensitive sectors, and then in turn with farmers, herders and the most vulnerable communities, with built-in channels for feedback and end-user input into climate service development. It is the hope that these National frameworks, rooted in appropriate institutional setups at the national level and resting on multidisciplinary collaboration and cross-ministerial partnerships for the production and communication of salient climate services in the country, will at last overcome the obstacles to climate information access and use by the most vulnerable communities in West Africa, and beyond.

The pilot experiences of Burkina Faso, Niger and Mali were presented at the Extraordinary Congress of the World Meteorological Organization on the GFCS, held this October 26-31, 2012 in Geneva, as a means to encourage other meteorological offices across the world to light the baton, and also go at the encounter of their stakeholders and end-user communities and whet demand, across all climate-sensitive sectors in the country.

4. **Recommendation for Up-scaling**

Host a National Workshop for Climate Services to get the institutional setup and framework right for cross-institutional collaboration, in every country where you wish to scale up climate services.

Blueprint documents to scope national stakeholders to invite to such national are attached as annexes to this document.

- For more information on the workshop methodology utilized, please contact Dr. Arame Tall, arametall@gmail.com
- For more information on the GFCS, contact Mr. Filipe Lucio, GFCS Office Head, World Meteorological organization (WMO), flucio@wmo.int

5. **Annexes**

Towards the Establishment of A National Framework for Climate Services:

Mapping National Stakeholders & End-Users:
A Dynamic Model

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**GOAL:**
Identify All Key National Stakeholders to Engage and Invite to the National Framework for Climate Services Inception Workshop

- **STEP 1:** Identification of all climate-driven problems encountered in the country, which climate services at all timescales could play a role in resolving.
- Hazards (Civil protection/disaster prevention)
  - Floods
  - River flooding
  - Drought
  - Strong Winds
  - Thunderstorms
  - Other?

- Diseases & epidemics sensitive to weather/climate (health)
  - Malaria
  - Menengitis
  - Rift Valley Fever

- Food Security (Agriculture, Livestock)
  - Excess/deficit rainfall impacting national production
  - Pests
  - Crop diseases

- Other key sectors impacted by climate/weather variability and change?

  ❖ **STEP 2: Identification of Stakeholders working on each problem (potential actors in the production and communication of climate services across the information chain), at all levels of decision-making from national to community level.**

**Questions to ask:**

- Who are the key stakeholders already mandated to provide climate information and/or climate services to vulnerable communities?
  - Who is making use of the information/services, whose task could be improved with climate information/services?
  - Who has a potential interest in utilizing climate services?

- Who are the critical decision-makers/institutions to invite to the Discussion table, in order to establish a National Framework on Climate Services (production, packaging and communication to vulnerable communities)?

**Selection Criteria:**

- Decision-makers of highest political rank (to anchor the process)
- Up & coming early career professionals and technicians (to sustain the process)

**Key issues to address at the end of National Workshop on Climate Services:**
Requisite processes to enable information flow from the National Met service to relevant institutions (an MoU?) for the provision of salient climate services to vulnerable communities

Define appropriate Institutional framework for climate service provision and clarify institutional mandates
- Who is in charge of producing the information
- Who is in charge of interpreting & packaging the information for target end-users (climate service production- all partners in this endeavour)
- How does the chain of information work

Whetting further demand for climate services from other stakeholders (not present at the workshop)

Firmly placing the National met at the service of development
- Appropriate institutional framework
- Establishing a national framework for Climate Services, starting with the national Met and ending with the vulnerable communities.

- **Main Stakeholder Categories**

  - **NATIONAL/SUB-NATIONAL STAKEHOLDERS**

1. **Climate Service Providers**
   a. Operational
      i. National Hydro-Met Service
      ii. National Hydrology Department
   b. Researchers
      i. University climate modelers
      ii. Agricultural Scientists (National Agricultural Research Center?) & Agro-meteorologists
      iii. National Public Health Research Center
      iv. Ecological Monitoring Services
      v. Hydrological modelers (i.e. of the large River Basin Commissions)

2. **National-level users - relays (across sectors)**
   a. National mandated Disaster Management Unit
   b. Line Ministries & technical services
      i. Water
      ii. Livestock
      iii. Agriculture
      iv. Health
      v. Civil Security (Interior)
      vi. Transportation
vii. Infrastructure
viii. Tourism
ix. Energy
c. Decentralized services (i.e River Basin Commisions)
d. Professional Communicators
   i. Traditional / press
   ii. National environment/climate journalist network?
e. Private sector (sustainability/public-private partnerships)
   i. Phone companies
   ii. Foundations
   iii. Socially responsible national business corporations
f. Development partners (donors)
   i. Embassies
   ii. UNDP & other Technical-Financial Partners (PTFs)
   iii. World Bank

3. Final end-users

   a. Farmers
   b. Pastoralists
   c. Fishermen
   d. Communities exposed to disasters (urban/rural)

❖ GLOBAL/REGIONAL PARTNERS

- ACMAD
- AGRHYMET/CILLS
- Civil Security: ECOWAS Early Warning Department, OCHA
- Food Security: CGIAR CCAFS / WFP
- Health: WHO
- UNICEF
- World Bank
- UNDP (AAP / GEF)
- All Donors and Development Partners in country

❖ STEP 3: Draft Follow-up plan:

Begin drafting a white paper with proposed Action plan to overcome the barriers to salient climate services production in your country. Such an Action Plan will guide the definition of Standard Operating Procedures (who does what) at the end of the National Workshop on Climate Services to enable information access, packaging and communication to communities at risk, one starting from the National Meteorological Department and ending at the vulnerable farmer or pastoralist.
Additional Links:
- WMO Video on National Frameworks for Climate Services
- PPT presentation on the results of GFCS pilot workshops for climate services in West Africa
Case Studies Under Good Practice Theme #2. Reaching the "last mile" at scale:

**Theme 2 Case Study #1: Grameen Uganda SMS-based farmer advisory delivery**

*Mobile Weather Alert: Communicating weather warnings and advisories to agricultural communities through Community Knowledge Workers via Mobile Communications*

**Duration:** 1 year Pilot Project starting in November 2011 and ending in December 2012, covering two main growing seasons (March - June 2012 & September – December 2012) with planned countrywide scale up after the pilot project.

**World area covered:** Kasese District in Southwestern Uganda near the border of the Democratic Republic of Congo

**Number of farmers touched:** 12,561 Farmers are registered in Kasese District to receive 10 day, Monthly and Seasonal weather forecasts on their Mobile Phones via SMS. Community Knowledge workers have provided over 16,000 Weather Information services to farmers through the use of App enabled Smart Phones

**Lead organization:** World Meteorological Organization

**Partners in implementation:** Uganda Department of Meteorology, World Meteorological Organisation

**Funded by:** World Meteorological Organization and Bill & Melinda Gates Foundation

**Most important lesson learnt:** Providing timely and accurate weather information to rural farmers can mitigate the increased risks of weather and climate variability faced by subsistence farmers, and will ensure food security and poverty reduction through boosting Agricultural production.

I. Introduction/Background

a. Rationale

Agriculture in Uganda is one of the major economic activities, and 80% of the population is involved in agricultural production as a source of livelihood. Most agricultural activity is subsistence and is carried out in rural areas at the grass roots level and is rain fed. It is therefore very affected by severe weather and climatic variability. Severe weather events like prolonged dry spells, hailstorms and floods have become frequent and thus the traditional planting calendar and indigenous methods of crops husbandry have been adversely affected, which has devastated the agricultural sector and food production.

Through the World Meteorological Organization, it was noted that such effects of weather and climate variability could be avoided in agriculture if farmers had access to timely, reliable and localized weather information. Agricultural activities could be planned more effectively if rural farmers had seasonal information on rainfall and temperatures to help them decide which seeds to plant or when to plant. The information would enable the rural farmer to identify planting dates and the likely duration of the coming rainfall season, and make choices about inputs that could improve yields.

It was imperative therefore to build and improve capacities, infrastructure, knowledge and partnerships related to climate risk management, through which farmers would receive timely climate and weather information for better planning of planting and harvest dates.
b. Objectives

- The main objective of this project is to increase resilience at the community level to weather variability in agriculture by informing and advising rural farmers on the use and application of climate and weather information and how climate change is likely to affect production towards improved agricultural production for food security using the mobile phones through the Community Knowledge Workers.
- Provide reliable, accurate and actionable weather information to farmers through mobile phones so that they can improve their agricultural yields and incomes.
- Teach the Community Knowledge Workers (CKWs) on how to use simple Rain gauges to collect data and how to send the information to the Uganda Department of Meteorology with their cell phones. The data they collect would improve the quality of the weather and climate information products that the Uganda Department of Meteorology would provide back to them.

c. Anticipated outcomes

- Increased resilience to weather and climate variability and change through sensitisation and improved interaction between Uganda Department of Meteorology, Community Knowledge Workers and the farmers.
- Better communication methods established for dissemination of agricultural meteorological information and agricultural advisories in conjunction with weather info to farmers.
- Observation gaps addressed through the use of Community Knowledge Workers to improve the quality of agricultural meteorology in a pilot area.
- Use mobile phones to reach out and provide information to the “last mile” farmers in hard to reach areas that are usually ignored by traditional extension workers.
- Farmers progress out of poverty due to adoption of weather information services provided
- Socio-economic analysis completed and the plan prepared for roll out of programme across wider areas in Uganda.

2. Methods Brief

Through support from WMO, UDOM provides agricultural advisories to Grameen Foundation in conjunction with daily, 10 day, monthly and seasonal weather and climate forecasts in relation to the production of different crops. This information is then relayed to CKWs via mobile phones, which is in turn accessed by the farmers on needs basis. The Grameen Foundation also relays this information to registered farmers’ mobile phones through SMS in their local language.

The Grameen Foundation, through funding from the Bill and Melinda Gates Foundation, has set up a countrywide, village based, network of Community Knowledge Workers who are equipped with a low priced smart phone with a locally built App which contains agricultural information. The CKWs act as a knowledge bridge between hard to reach farmers in villages, and experienced agriculturalists who regularly provide the agricultural information loaded onto the App on the smart phone. The information includes topics on crops, livestock, market prices, regional weather, and water harvesting techniques.
3. Results to Date

a. 32 ten-day weather forecasts and advisories have been received from UDOM and sent to the Mobile phones of the 12,596 registered farmers in Kasese district.

b. Two seasonal forecasts have been relayed to farmers with the latest being sent out in the first week of September 2012.

c. CKWs have provided more than 16,000 weather forecasts to farmers since the start of the project.

d. Trends from analysis of the weather information provided to an individual farmer by a CKW show an average repeat usage of 3.4 times per farmer, which shows increased reliance on the weather information provided.

e. From a recent mid-term evaluation, 87% of the farmers interviewed reported having used advice and information about when to plant crops and manage them.

f. 78% of the farmers interviewed in the mid-term evaluation conducted in August 2012, said the 10-day weather forecasts sent to them were mostly accurate.

g. From a roving seminar conducted with farmers in August 2012, a farmer showed a demonstration farm where he used one part of his garden to practice agriculture based on the advisories from the weather channel, and another part where he didn't adhere to the advisories. He reported good yields from the demonstration farm set up using the agricultural advisories and a bumper harvest and market in time of scarcity.

4. Lessons learnt

a. Lessons from success:

i) As a good practice, the agricultural advisories and weather information forecasts sent out should be translated into the local language due to high illiteracy levels in the rural communities

ii) Weather forecasts should be timely because timing is very important in agricultural productivity in reference to onset of rains.

iii) Mobile phones have proven an effective channel of communication with farmers due to the high penetration levels to areas that are not reached by traditional extension workers. Leveraging this technology is a good model for scale up.

b. Lessons from failures:

i) Sensitization of farmers to the importance of adopting the agricultural advisories and weather forecasts is key because of low levels of technological adoption in the rural communities

ii) There is a need to communicate weather forecasts to various stakeholders in the agricultural sector as they interface regularly with farmer groups and are vital to community development
The African Farm Radio Research Initiative (AFRRI)

Duration: 42 months
World area covered: 5 countries in Africa, Tanzania, Uganda, Kenya, Malawi, Ghana and Mali
Number of farmers touched: 40 million
Lead organization: Farm Radio International (FRI) in collaboration with World University Service of Canada (WUSC)
Partners in implementation: Farmers, Agricultural knowledge partners, Radio Stations, Ministries of agriculture, Extension services, other development actors in the countries
Funded by: Bill & Melinda Gates Foundation
Most important Lesson learnt: Participatory Radio Campaigns provide low cost and effective agricultural information services which inspire farmers to try out improved practices.

1. Introduction/Background

The African Farm Radio Research Initiative (AFRRI) was a multi stakeholder action research project created to gather solid evidence to confirm that rural radio has the capacity to improve food security in Africa, as this was lacking. AFRRI was implemented in Tanzania, Malawi, Uganda, Mali and Ghana to answer the following research questions:

1. How effective is the radio in enabling smallholder farmers in Africa to address food security challenges with a particular focus on increasing or diversifying food production, improving land use management and reducing post harvest losses?
2. How can new technologies such as cell phones and MP3 players increase the effectiveness of the radio as a sustainable, interactive development communication tool?

A Participatory Radio Campaign (PRC) designed by FRI is a radio-based activity conducted over a specific time period where a broad farming population is encouraged to make informed decisions about adopting a specific agricultural technology. AFRRI tested the PRCs’ effectiveness through the production and broadcasting of 4 to 6 month series of radio programs to increase farmers’ knowledge, and inspire them to analyse, discuss, and make an informed decision to adopt it to improve their livelihoods.

2. Methods Brief

A robust research design was used to look at the effectiveness of PRCs as advisory services aimed at behaviour change; how to make the radio more interactive by integrating Information and Communication Technologies (ICTs); and how to develop an effective radio based Market Information Service (MIS). From 2008 to 2010, AFRRI worked with 25 radio stations in the five countries to research, plan and produce two PRCs per station. Around each station’s area of coverage, three types of communities were selected. “Active listening communities” (ALCs) where residents could listen to broadcasts, were engaged in planning and giving feedback to the programs, and frequently interviewed. In “Passive listening
communities’ (PLCs) audiences would listen only if they chanced on the program by themselves, but did not have other contact with the program. The PLCs are typical of the majority of the people reached by the radio station's broadcasts. Finally “Control communities” (CCs) could not receive broadcasts and were not aware of the PRCs. 49 PRCs were broadcast about a range of agricultural technologies.

In August 2010, AFRRI carefully evaluated 15 PRCs (three per country) to find out whether: a) farmers listened to them (and, if so, how frequently); b) they resulted in increased knowledge about the improved practice; and, c) they resulted in adoption of the improved practice by farmers. In total, the survey reached 4500 farmers – 300 per PRC. One third of these interviews were conducted in ALCs, another third in PLCs and a final third were in CCs.

3. Results to Date

The key finding is that by listening to the radio, 21% of listeners in PLCs gained the knowledge promoted and put that into practice, (Figure 1), while 39% in ALCs and one out of 25 people started practicing in CCs. An estimated 40 million farmers in the 5 countries were served by the 25 AFRRI partner radio stations, indicating that the radio is an effective agent of change, disseminating knowledge out to more people more quickly at low cost. 70% in ALCs and 52% in PLCs demonstrated an increase in detailed knowledge on the technologies compared to only 18% in CCs.

![](image_url)

Figure 1: Impacts of PRCs in communities

4. Lessons Learnt

a. Lessons from success:

i. Best practices to replicate/scale up

*The PRC approach:* Generally a PRC attracts 22% to 99% of community members as regular listeners, 50% of which gain the knowledge promoted and one in five would actually introduce it. For climate change adaptability, Volta Star in Ghana promoted use of NERICA rice, suitable to drier climates. In ALCs, 63% and 23% in PLCs started planting it. In
Tanzania, Sibuka FM promoted use of manure and improved maize varieties, 50% in ALCs, 22% in PLCs adopted the practice and none in CCs.

ICTs and the radio: Weekly SMS alerts sent to listeners’ phones 30 minutes prior to a broadcast boost radio campaign listenership by up to 20%, while Interactive Voice Response (IVR) technologies improve access to information by farmers through their mobile phones.

Reach and impact of extension workers: Improves because they can be heard on radio programs through call-out programs.

b. Lessons from failures:

ii. Recommended models / avenue for scaling-up

Some PRCs were not successful. The lesson learnt is that it is difficult or impossible to predict whether a PRC will flourish or have minimal impact on local agricultural practices. Several factors may help determine the success factors associated with PRCs including the extent to which radio stations are already listened to and trusted by the targeted beneficiaries; the complexity or difficulty of adopting the improvement on the part of the target audience; and the availability of good extension support to support the adoption of the practice.

Online links to AFRRI reports:

Participatory Radio Campaigns and food security: How radio can help farmers make informed decisions:

Marketing on the airwaves: Marketing Information service and radio:

The new age of radio: How ICTs are changing rural radio in Africa:

Theme 2 Case Study #3: Dissemination of weather and climate information in local languages, Kampala, Uganda

Duration: 2013-2015
Project Area: Uganda in Mukono, Iganga, Luuka, Kaliro, Buikwe and Kayunga districts
Supervising Institution: Department of Meteorology
Project Implementation: Farmers Media Link Centre
Collaborators: National Agriculture Research Organization, District Local Governments, NGOs, Media Houses, Makerere University, Local and International Organizations Partners.
Collaborators at Grassroots Village Level: Farming Groups, Schools, Village savings and Credit Groups (Village Banks) and Faith Based Organizations

Most important lesson learnt: Media can serve as an important link or information relay to reach hundreds of vulnerable users, in a language that the farmers can understand.

1. Introduction/Background

The dissemination of weather and climate information in local languages initiative in Uganda is a unique approach that centers on enhancing the understanding and timely delivery of climate information to rural farming communities using a variety of dissemination channels. The Farmers Media Link Centre and the Department of Meteorology together with support from collaborating partners is translating and disseminating Seasonal Climate Forecasts to farmers in Uganda in several local languages. These languages are Luganda, Lusoga, Runyankore, Rukiga, Runyoro, Rutoro, Luo, Lugbara, Ateso, Japadhola and Akarimojong. The dissemination of these forecasts to farmers covers most of the districts in Uganda.

The African continent is listed by the Food and Agriculture Organization as the most food insecure continent hosting the majority of the 870 million hungry people of the world. In addition Africa has a high mortality rate among children below five years and expectant mothers. There is also widespread malnutrition among the child and adult population with insufficient intake of food for work (rich in calories) and food to build the body (rich in nutrients).

Causes: High prevalence of poverty, disease and illiteracy has made the Africa situation complex and difficult to improve. The situation has been made worse with the negative impacts of climate vulnerability and change. Information that would assist vulnerable communities to lift themselves out of the grim conditions available but is not accessible to those most in need. Farmers in Africa are highly vulnerable to weather and climate on a daily basis. Their daily activities and means of survival are greatly influenced by decisions they have to take often at short notice and in an atmosphere of increasing uncertainty.

The Department of Meteorology in Uganda, responsible for National Hydrological and Meteorological Services, issues regular information and advisories on weather and climate for various parts of the country. Unfortunately, this information does not get to most farming communities because of various bottlenecks including logistical challenges, lack of effective communication channels, and language barriers. The information is provided in the official English language, which most farmers do not understand.

In the past farming communities have relied on local knowledge of weather patterns to plan their farming activities. However, increasing weather and climate variability has rendered this indigenous knowledge less effective.

Potential Impact of Climate Information Services: Available climate information and relative advisory services offered by the Department of Meteorology on a regular basis needs to reach out to various users for timely application. Effective communication to user communities offers great potential to support resource poor farmers in making important decisions to improve management of climate sensitive agricultural risk as well as adapt to climate vulnerability and climate change now affecting them in their daily activities.
Global Framework for Climate Services (GFCS): Delegates at the WMO, Third World Climate Conference in Geneva in 2009, recognized the growing relevance of climate services and the 155 nations represented at the Conference endorsed the Global Framework for Climate Services (GFCS). The framework seeks to strengthen the production, availability, delivery and application of science based climate prediction and services. The GFCS in its Implementation activities plans to close the gaps in climate services especially in relation to agriculture, water, aviation and health among others, particularly in least developing countries such as Uganda.

Climate Services in Africa: The First African Ministerial Conference on Meteorology 2010, sitting in Nairobi recognized and recommended the increased support to strengthen National Hydrological and Meteorological Services for better generation of climate information and products for development in Africa.

In the recently concluded Second Meeting of AMCOMET in Victoria Falls Zimbabwe, the ministers responsible for meteorology further recognized the effectiveness of weather and climate services for socio economic development in Africa.

Climate Services in the Greater Horn of Africa and Uganda: For several years, the IGAD Climate Prediction and Application Centre together with NHMS in the GHA region and in collaboration with international climate centers have produced seasonal climate forecasts for the region. ICPAC has provided regular updates of the performance of the climate on a regular basis. The Department of Meteorology in Uganda has downscaled these Greater Horn of Africa regional climate forecasts to national scale for dissemination in Uganda. Climate sensitive sectors such as agriculture, health, energy, water, and others have participated in developing national advisories to the climate forecasts.

Dissemination of Seasonal Climate Forecasts and Climate Information: Seasonal climate forecasts have been disseminated to the public through several channels. These include climate bulletins distributed to international organizations, NGOs, local district governments, Office of the Prime Minister and line ministries as well as the ministry of information and the media.

Regular updates of the seasonal forecasts have been supplemented with daily weather forecasts through the media, especially through radio. The information has primarily been communicated in English, which the official working language in Uganda.

However, effective dissemination of this vital weather and climate information has been hampered by a multitude of challenges:

1. **Timely delivery of information:** Over 85% of the population in Uganda is located in rural agricultural areas, many of which are remote and hard to reach. It takes a long time to disseminate information through the districts and NGOs.
2. **Language Used in Transmission:** The information is delivered in English, which most farmers do not understand. It also contains technical language that is translated differently by various communicators.
3. **Packaging of Information:** The way the information is put together for relevant users is difficult to use effectively.
4. **Usefulness of Information**: The relevance of information to the recipient is not taken into consideration in production, and the information provided thus is often too generalized.

5. **Information Channels**: Information also fails to account for the interests of small vulnerable farming communities who have limited resources to access standard communication channels.

### 2. Methods Brief

- Special Seasonal Forecasts for the areas translated into local languages of Lusoga and Luganda
- One sub county selected per district to receive the information in all the villages
- Regular updates made and radio broadcasts supplement the forecasts as the season progresses
- SMS messages for updates to be developed

Seasonal climate information in local languages is distributed to farming communities through the sub county focal point persons in the six districts for the village banks, faith based organizations, farming groups and selected primary schools.

#### i. Dissemination through Schools.

This dissemination method involves school children who bring the family household together to discuss important climate information that is beneficial to the whole family. It is intended to enable the family to understand the value of and apply climate information for decision-making. This is a unique approach to dissemination where the school children are trained as messengers. Currently, information rarely reaches all members of farming households. Adults who receive the information through community meetings, over the radio, or from other farmers are not obliged to tell the rest of the family. Even husbands fail to pass on the whole information to their wives and vice versa. There is also little discussion to plan how to use the information that they individually receive. In this approach the child delivers the information to both parents as well as the other members of the family. Thereafter the information is meant to be placed in a convenient and safe place in the house or shelter where others including visitors can read it for themselves in the local language.

- One hundred primary pupils are identified from Primary Three-Primary six. These are 9-14 years of age range.
- The selection is done by the school head teacher in collaboration with the project focal point teacher
- The project staff brief the teacher on the essence of the forecasts and what is required of the pupils in delivering the message to the household at home
- Each pupils is given a forecast bulletin the local language of the area. The pupil on arrival at home calls the family together to deliver the climate news. These include the father, mother and siblings.
- The information is read to the family in the local language and any queries or concerns are noted by the pupil.
- The family members are encouraged to freely discuss the information and plan how to use the information they have received for their farming and daily activities.
Monitoring and Evaluation:

- Monitoring and evaluation tools have been developed in the form of questionnaires.
- Participating pupils and household members’ knowledge of climate information and level of utilization is captured before the intervention and again after the season.
- Household members will inform how they used the information.
- Challenges and shortcomings in the information will be captured.
- What information was useful and what information is required for improvement will be captured.
- The evaluation tool will seek to give an economic value and social value to the intervention.

Participating primary schools are using the climate information for the whole school as part of their school farming activities. The schools are planting highly nutritious Orange Fleshy Sweet Potatoes (OFSP) for teaching the children the benefits of using the climate information for better farming production. In addition, the children are being taught the benefits of consuming highly nutritious food and the school is solving a feeding challenge to the children.

ii. Dissemination through Farming Groups

There are existing farming groups located within the selected sub counties who are receiving the climate information and applying it in their activities. In particular they have selected enterprises to promote using the climate information and other improved farming methods for economic gain.

These groups are highly organized and they have chosen to engage in various selected enterprises including horticultural crops, Orange Fleshy Sweet Potatoes, Maize production and tree planting.

Monitoring and Evaluation: The farming groups are organized and registered at the sub county level. Through individually administered interviews as well as discussion with the groups we will capture the impact of the intervention. The various enterprises selected form the basis for economic evaluation of the use of climate information.

iii. Dissemination through Religious Partners

The Church of Uganda has offered to participate actively in the dissemination of the climate information through its organizational setup in the participating districts. The dissemination of the Climate Information through the churches has been received enthusiastically but care has been taken to explain that the seasonal forecast is probabilistic and not deterministic.

The Parish priests in six churches in the participating districts have distributed the seasonal forecasts as well as Public Awareness materials on Climate change and climate change adaptation. Reverends also attest that they are incorporating the climate information within the daughter church programs.
Nutrition: The Church is establishing mother gardens of Orange Fleshed Sweet Potatoes for distribution to farmers within the project areas. They are convinced that the intervention will produce better farmers who are more food secure.

Monitoring and Evaluation: The monitoring and evaluation of this dissemination approach is using questionnaires and group discussion interviews. The organizational structure of the church hierarchy will enable close monitoring of activities as well as evaluate the community benefits that the intervention will enable to be achieved. Nutritional improvement and food security status of the communities will also be easier to monitor and evaluate.

iv. Dissemination through Women Village Savings Groups

Womens’ saving and credit groups numbering 30-50 members are common in Uganda. Three groups have been identified in each participating district to receive climate information and use it for better farming. Lack of quality seed was identified as a common problem in the region affecting good farming output. The Village Banking Groups using climate information to produce better seed for distribution within themselves and for sale to other members of the communities at an affordable fee. They are producing quality sweet potato vines and high nutrition beans.

Monitoring and Evaluation: The monitoring and evaluation of this dissemination approach will be conducted using questionnaires and group discussion interviews. The intervention seeks to enhance the availability of good quality seed to farmers in the participating districts as well as empower the members of the village saving banks economically. There is a value that can be attached and quantified to this intervention.

Overall Evaluation: It is important to note from the outset that the value of climate information that the farmers receive has to be carefully considered alongside other factors influencing production in the project area. These may include existing knowledge and practice as well as activities by other development organizations including agricultural extension services and local government initiatives.
Case Studies Under Good Practice Theme #3. Giving Farmers a Voice in Climate Service Production:

Theme 3 Case Study #1: Identifying farmers’ information needs to manage production risk in the Indo-Gangetic Plains of India

Duration: 2011-12
World area covered: Indo-Gangetic Plains (IGP) of India- five states Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal
Number of farmers touched: 1200 farmers
Lead organization: CIMMYT
Partners in implementation: -
Funded by: CCAFS
Most important lesson learnt: Farmers have access to a wide network of information sources, but they still feel that they don't get adequate, timely and reliable information about how to tackle the challenge of improving agricultural output in the changing climatic conditions.

1. Introduction / Background

a. Rationale:

Farmers face new challenges due to climatic variability, market uncertainty and lack of information on what to do at these times. It is difficult for farmers to access information on these new occurrences and to maintain yields and achieve better outputs. Climate variability is the principal cause of production uncertainty—characterized by excessive or insufficient rainfall as well as timeliness of rainfall, extreme temperature, and unpredictable snowfall. Other key factors that affect production are insect and diseases, availability of inputs, new crop varieties as well as farming practice methods, soil erosion, and inadequate supplies of labor and power. All of these factors have a direct and immediate impact on yields leading to production uncertainty. Although various formal and informal—both traditional and modern—information networks exist, they are often criticized for their lack of knowledge or understanding of the farmer’s perspective and farmers needs. To address this issue, it is most important to understand the demand for information relating to agricultural activity that farmers have and how it varies across regions, crops and farmers with different size of land holdings.

b. Objectives:

The main objective of the study was to identify the information needs of the farmers that would enable them to manage risk in the wheat, maize and rice cropping system in the five states of the Indo-Gangetic Plain (IGP) of India. The specific objectives are:

- Identify the existing information networks, information needs and constraints of farming households to access information in IGP
- Analyze the factors that impacts the selection for information sources by farming households
• Identify the extent of use of mobile phones by farmers for agricultural information, its benefits to farmers for agricultural activities and farmers perception on further use of mobile phones to manage production and marketing risks.

c. Anticipated outcomes:

Project results will provide a background for identifying information gaps and appropriate channels as well as the potential areas where information delivery through mobile phones can have an impact to strengthen agricultural productivity and farmers’ incomes.

2. Methods brief

Data was collected at CIMMYT through a primary survey of 1200 farming households in five Indo-Gangetic states (Bihar, Haryana, Punjab, Uttar Pradesh and West Bengal) of India, during January-March 2011. Multi-stage sampling technique was used for selecting states, districts, villages and households for the study. Four districts were chosen in each state based on geographical locations. In each district six villages and in each village ten households were randomly selected. This survey collected information on socio-economic characteristics of households, household assets, access to different types and sources of information- frequency, timeliness and usefulness. A multivariate probit specification is being used to examine how different socio-economic factors influence the decision of farmers in adoption of different sources of information.

3. Results to Date:

a. Information Needs- The most commonly cited information need of the farmers for all the drops is the information about input availability: What input to use? How much to use? When and from where to purchase inputs? Inputs include seeds, fertilizer, machinery, pesticides, weedicides and labor. These information needs are growing with the change in climatic conditions and the timing of rainfall. The other most important information need is about pre sowing- soil quality testing, land preparation and good farm practices, choice of crop, and most suitable varieties.

b. Information Networks- All surveyed farmers reported using multiple sources to access all required information relating to agriculture and more specifically climate change and risk management. Farmers do not find any single source providing all that they need and don’t trust any particular source more than others. The prime source of information was the other farmers (91.42%) living in their neighborhood or nearby villages. Other important information sources were input dealers (67.67%), television (54.75%), mobile phone (35.7%) and newspaper (33%). Based on these three criteria- timely availability, accuracy, and reliability of information- 41.42 % farmers ranked other farmers as the most important source of information, followed by input dealers (20.83%), and mobile phones (10.25%).

c. Factors influencing choice of information sources- Resource poor and smallholder farmers usually depend on face-to-face sources of information such as other farmers and input dealers. With higher education levels and better networks, younger farmers and large-scale farmers tend to use modern sources of information like the Internet, telecenters and mobile phone based services. Better-educated farmers prefer to use modern ICTs rather than traditional sources like newspapers, radio or television. Access to household
assets like radio and television is significantly related to Internet and mobile phone use. This indicates complementarities in use of these two sources of information.

4. Lessons Learnt

a. Lessons from success:
   i. What are good practices to replicate/scale up?

Three case studies, on the Indian Farmers Fertilizer Cooperative Limited (IFFCO’s) Kisan Sanchar Limited (IKSL) voice-based model; Reuters Market Light (RML) small message service (SMS)-based model, and the Kisan Sanchar SMS-and voice-based model, were analysed in depth and are available as CIMMYT Socio-Economics Working paper no. 3 (Surabhi Mittal, 2012). Overall, the basic parameters for any mobile-based information delivery system are efficiency in delivery, relevance in content, and a firm content calendar for timely delivery. The effectiveness of ICT in passing on information to farmers, particularly small landholders, is the key to its successful utilization as a complementary dissemination mechanism for extension services.

In the surveyed sample almost all the farmers have access to mobile phone, but only 41 % of those farmers use mobile phones for accessing information relating to agricultural activities. Mostly service provides deliver information to the farmers on their mobile phones in the form of SMS. It is important to deliver information in localized language because of poor literacy about English. 76 % of the farmers who own mobile can receive SMS in local language. But literacy being one of the major constraints with farmers, the ability to read and type messages on mobile phones is very low. Only 51.3 % of farmers in the IGP can read the SMS, and 28.6 % of the total can reply back in text form. Many of these farmers are unable to read the information/messages themselves.

Although farmers were not using the services, 90 % of the farmers expressed interest in receiving the information on their mobile phones and also willing to pay (47 % of farmers) for such services provided that the content is relevant, services are useful and trustworthy, and bring some impact on their incomes, farm yields, and cost of production. Farmers preferred voice messages over text messaging.

ii. What models / avenues for scaling-up do you recommend?

The three main components of any service delivery model are ‘WWWH’: What to deliver? Whom to deliver, When to deliver and How to deliver? In this case agri-information has to be delivered to the farmers using mobile phones. This looks simple but in reality is a complex undertaking.

• What to deliver - The information to be delivered is the ‘soul’ of the model. This content cannot be developed by subject-specific experts alone; it has to be validated and generated in a timely fashion in accordance with local cropping calendars. Scientific and technical knowledge must be converted into simpler language that can be understood by the target farmer groups. The local language, appropriate content creation and its validation are important parameters to be considered. Information delivery must be demand-driven. Monitoring and assessment of farmer needs has to be a continuous process.
• Whom to deliver- The database of the farmers to whom this information is to be delivered is to be created based on some predefined criteria. If the farmer does not want the information or is not accessing information on the mobile phone listed in the database, then this information delivery is not useful. The database has to be dynamic in nature as it will change as farmers change their service providers or mobile numbers. Information about their land size, cropping pattern, soil type, geographical location, types of inputs used, variety of seed used, irrigation facilities, etc. has to be integrated into the database to be able to deliver relevant information and move beyond the status quo for information delivery.

• When to deliver- The timing of information delivery is crucial. This is governed by the cropping cycle and the cropping pattern. It is also important to consider the ability of farmers to access information at a particular point in time (e.g., farmers usually prefer to get the market and price related information in the evening, so that they have sufficient time to make a decision and take their produce to the markets next morning).

• How to deliver- The information sent on mobile phones in the form of text message or voice message has to be based on the preference of the targeted consumers of this information.

b. Lessons from failures:

In India, many mobile-based information service providers have operated since 2007, but the survey highlights the poor penetration or awareness about these services among the surveyed farmers. Out of 1200 only 44 farmers were aware of the services, and only 13 farmers have used the services. The most popular service provider was IKSL, with 26 users. The most important message that farmers conveyed about these services is that although they have heard about them from others, they don’t understand proper usage and the potential benefits. No one has approached them to guide them on usability of these information sources. Some felt that the messages delivered on mobile phones through these service providers are not relevant or useful and many felt that costs are too high. In addition, farmers’ choices may be constrained by contextual factors like insufficient inputs markets, seed production, institutions like insurance and credit, price policies, subsidies on machines, etc., despite of efficient delivery of information.

In order to be an effective and efficient model, messages delivered through the system must be actionable and hence should be re-proposed as an “actionable byte of information.” Mobile-based information can be the most suitable model as it creates a two-way communication between the information provider and farmer. To be a viable approach it should be able to handle the obstacles of level of literacy, clarity of the information and readability on mobile handsets.

Theme 3 Case Study #2: Integrating indigenous knowledge in climate risk management in support of community-based adaptation in Nyangi Community, Kenya

Strengthening the Capacity of ICPAC in Climate Prediction and Information Dissemination for Improved Agricultural Production and Food Security to Enhance Adaptation to Climate Variability and Change
Duration: 3 years (August 2011 – August 2014)  
World area covered: Nyangi, Kenya  
Number of farmers touched: Approximately 200 households  
Lead Organization: IGAD Climate Prediction and Applications Center (ICPAC)  
Partners in implementation: Kenya Meteorological Department, Bondo University College and National Drought Management Authority  
Funded by: The Rockefeller Foundation  

Most important lesson learnt: The major lesson learnt from this project is that precise climate prediction, plus proper interpretation and packaging, timely dissemination followed by proper and timely use by the respective farmers in the user communities translates into improved agricultural productivity, food security and sustainable livelihoods.

1. Introduction/Background

a. Rationale

Most economies in GHA rely on agriculture, which is dominantly rain-fed. The region is prone to severe & frequent climatic extremes esp. floods and droughts. ICPAC, through GHACOFs, produces seasonal climate outlooks, monthly and decadal updates. The outlooks are downscaled at country level by NMHS. However, the majority of targeted users of climate information (farmers) usually miss out. The climate forecast information is mainly disseminated through Internet, Television, Newspapers, & Perhaps Radio and only 20% subsistence farmers access these forms of media.

There was therefore need to precisely interpret the forecasts, properly package it into user-friendly, location specific information products and innovatively disseminate the forecast and related information to farming communities to enhance their capacity to increase food production for improved food security and sustainable livelihoods.

b. Objectives

The overall objective of this project is to strengthen the capacity of ICPAC to provide downscaled demand-driven climate information to agriculture and food security sectors to enable these sectors cope with climate variability and future climatic changes for sustainable food security in the Greater Horn of Africa sub region. The specific objectives of the project include:

i. Provide technical capacity for the coordination and development of downscaled agro-based climate tools and products at ICPAC  
ii. Downscaling of climate information and products for application in Agriculture and food security sectors  
iii. Conduct a baseline study to establish the current status of crop agriculture and pastoral systems at the pilot sites with respect to use of climate information  
iv. To timely deliver agrometeorological products and services (information, warnings, and advisories) on climate related risk to agriculture and allied sectors  
v. Feedback and verification of the disseminated products and quantification of the benefits accrued from the usage of the products
vi. To provide scientific evidence to influence government policy formulation for incorporating climate information in agricultural decision making

c. Anticipated Outcomes of this project

The expected outcomes of this project include:

- **At institutional level**: Enhanced internal capacity of ICPAC to downscale, develop and disseminate agrometeorological products and services for improved climate risk reduction for agriculture production, food security and adaptation to climate variability and change for sustainable development in the Greater Horn of Africa sub region and to coordinate other agriculture/climate change programmes at ICPAC.

- **At community level**: Enhanced informed decision making by users for purposes of diversified livelihoods and improved food security among the vulnerable farming communities based on enhanced usage of climate forecast information in planning, management and operation of agricultural activities by crop farmers, pastoralists and agro-pastoralists.

2. Methods Brief

- Conducted baseline studies – to determined benchmark information in pilot sites
- Conducted needs assessment – to identify community priorities
- Conducted capacity building workshops at community level
- Interpreted, downscaled, packaged and disseminated seasonal weather forecasts and monthly & decadal updates including early warnings through workshops, use of an Internet Based SMS Broadcasting Program. The disseminated information package includes:
  - Expected dates of onset
  - Expected rainfall intensities & distribution (in time & space)
  - Expected length of season (cessation dates)
  - Expected climatic hazards (floods, hail storms, etc) during the season

- Developed agricultural and cross-cutting advisories based on the forecasted weather in a participatory manner and disseminated to the farmers. In turn, farmers use the information to make certain decisions like:
  - Time of planting
  - Types of inputs (crops, seed/varieties, fertilizer) to use
  - Timing of management practices (weeding, top dressing, pest control, hilling up)
  - Frequency of farm operations (for example weeding regimes)
  - Relay cropping to utilise inter-season residual moisture
  - Proper use of labour resources
  - Proper storage practices

- Farmers conducted demonstrations of best practices using the information disseminated to them by the project
- Conducting continuous monitoring and evaluation of ongoing activities by project team

3. Results to date
Generally, crop farmers realized higher yields for most crops as compared to what they used to harvest per unit area, with multiplier factor of approximately 1:100 and 1:120; and yield increment of 3-4 times for maize and sorghum respectively. Farmers attributed the high yields to the valuable capacity building and the weather forecast and agro-meteorological information and advisories the project delivered to them. This information helped them in proper planning, for example in; proper seed/variety selection, timely planting, proper crop management (fertilizer application, weeding, hilling up, etc). One of the excited farmers (Ms. Mary Ogello from Reru Community, Western Kenya) narrated that ever since she got married 35 years ago, this was the first time she recorded the highest yields throughout all her gardens (March-May 2012 rains).

On the other hand, the Masai pastoralists from Oloitokitok responded to our advisories by practicing the following:

- Preserved portions of their rangelands for grazing in the future
- Harvested and sold pasture seeds for income diversification: they used proceeds from pasture seed sales to procure 10 improved heifers to restock their herd having lost over 75% of their cattle during the prolonged 2009 drought in Kenya
- Practiced reseeding of their overgrazed, highly degraded pasture reserves
- Started a nearby market (every Wednesday) where they sell their culls; they used to sell their animals over 25 Km away
- The agro-pastoralists (small-scale irrigators) have responded to our advisories by planting the recommended crops and varieties (Maize, Onions, Tomatoes, Beans, and other vegetables) and followed good agronomic practices. They have now learnt that with proper planning and management, the products of irrigation are far much better than those from rain fed agricultural areas.

4. **Lessons Learnt**

a. **Lessons from Success**

The project has demonstrated that with accurate climate prediction, plus proper interpretation and packaging, timely dissemination followed by proper and timely use of weather forecast information by the respective farmers, community livelihood is improved through increased agricultural productivity and improved food security.

The other important lesson is that in order to build community resilience, all the allied sectors including health, education, marketing, and extra must work together with the agriculture and food security sectors in a holistic manner. Integration of indigenous knowledge in weather forecasting with the scientific climate prediction also enhances confidence building among the local predictor communities and thus improved uptake and utilization of weather information and related agro-meteorological products.

b. **Lessons from failures**

Climate and weather prediction are based on probability and are developed using historical data among other parameters. Due to the limited number and distribution of functional weather stations within user communities, in addition to local weather variations, it is
difficult to precisely develop location-specific forecasts; sometimes, we have noted quite significant variations from what is predicted to the actual observations. When such happens, farmers lose confidence in our messages.

Diagrammatic representation of the SMS Broadcasting System at ICPAC that is used to rapidly disseminate SMSs to registered climate information users within the pilot communities:

5. Additional Material (Pictures)
Plate 1: A Contour Trench dug by a farmer in Nganyi Community (HILLY) to slow down run-off and reduce the rate of soil erosion - following our advisory that there would be a weak El Nino event with likelihood of Landslides and soil erosion. The plants planted in the trench also enjoy moisture reserves during the dry spell.

Plate 2: A perfect Contrast between a conventionally planted garden (Left) and a customized, climate-based planted garden.
Theme 3 Case Study # 3. Integrating indigenous knowledge with seasonal climate forecasts in Lushoto, Tanzania

Promoting Integration of Indigenous Knowledge and Scientific weather and climate forecasting for risk management under a changing climate in Lushoto District, Tanga Region, Tanzania.

Duration: Three months
World area covered: Africa-East Africa
Number of farmers touched: 70 villagers in seven villages
Lead organization: Sokoine University of Agriculture (SUA)
Partners in implementation: Tanzania Meteorological Agency (TMA), Lushoto District Council, Selian Agricultural Research Institute (SARI)
Funded by: Climate Change Food Security (CCAFS)
Most important lesson learnt: IK weather forecasting complements scientific forecasting and if used together, farmers can benefit most.

1. Introduction / Background

a. Rationale

Agriculture is the leading economic sector in Tanzania. It employs over 80% of the population and accounts for 50% of the GDP and export earnings (URT, 2001). Agriculture in the country is mostly rain-fed, and its success is tied closely to weather and climatic conditions. Knowledge of the upcoming rainfall season becomes a matter of extreme importance to the livelihood of the people. Periodic droughts have adverse effects on the well-being of most smallholder farmers. Climate variability has therefore increased the need for actions to overcome the challenges faced by smallholder farmers in order to help them get out of poverty. This calls for appropriate, effective and informed decision making to allow farmers to organize their activities, in both the short and long term. There is need for appropriate, effective and informed decisions on when, how, and what to plant. This depends on the accuracy and reliability of the weather information and predictions. There is ample evidence of a gap between the type of climate information required by farmers and other stakeholders and what is currently supplied by the Meteorological Department and other climate information service providers in Tanzania. Access to location- specific rainfall forecasts that can assist farmers to take proper decisions at the farm level is very limited or non-existent. It is for this reason that many farmers and other stakeholders in the agricultural sector have resorted to indigenous forecasting using indigenous knowledge (IK).

b. Objectives

The overall objective of the project was to reduce the vulnerability of smallholder farmers to climate variability and change in Lushoto District through promoting the integration and utilization of indigenous knowledge and scientific weather and climate forecasting for risk management. The specific objectives were:
• Establish IK weather/climate forecasting zones and teams
• Identify and document existing IK in weather/climate forecasting
• Establish a weather/climate information flow system at District level
• Operationalize the integration and dissemination of IK and scientific weather/climate forecasts
• Mainstream the process of integration and utilization of IK and scientific weather/climate forecasting in the District Development Programmes

c. Anticipated outcomes of your project

A functional core team of experts at District level providing weather forecasts to farmers in Lushoto District.

2. Methods brief

The study was conducted in Lushoto District on the western side of the Usambara Mountain ranges. The District is one of the six districts in the Tanga Region and is situated between latitude 4°38’ to 4°57’S and longitude 38°29’ to 38°37’E. Altitude ranges from 200 m (lowlands) to 2000 m (highlands). Data collection involved structured interviews using a questionnaire and interviews with key informants. Key informant interviews and Focused Group Discussions (FGDs) were carried out in three selected villages. IK weather forecasting groups were formed and a core team was created to coordinate flow of weather forecast information. The functions of the core team were integrated into District development plans.

3. Results to Date

a. The findings suggest that a combination of local indicators are used in predicting the weather and climate of the area.

b. There are some indicators which are commonly used to predict a good rainfall season and onset of rain. The indicators include among others insects, the flowering of peaches and plums, the appearance of swarms of pirates, butterflies, frogs, ants and grasshoppers

c. The 2012 seasonal March-April-May (MAM) forecasts using IK and TMA were identical. The two approaches predicted that the MAM seasonal rains will be normal.

4. Lessons Learnt

d. Lessons drawn from this study and those from Makanya village support the complementarity of these two approaches.

e. When these approaches are combined together, better results can be obtained for farmer usage in making agricultural decisions.

f. The packaging and media of communication is key to ensure that current messages are disseminated. In Lushoto, Kiswahili was used as the language for communication.

g. Many stakeholders do not have a good command of Kiswahili and many indicators are reported in the native language Kisambaa. Farmers requested that the consensus weather forecasts be translated into Kisambaa
Theme 3 Case Study #4: Indigenous knowledge bank

Duration: 2 years
World area covered: Africa
Number of farmers touched: 
Lead organization: ENDA “Energy, Environment, Development”
Partners in implementation: UNITAR
Funded by: Co-financed by the European Commission, Austrian Development Cooperation and Switzerland Government.
Most important Lesson learnt: Indigenous Knowledge plays a great role on community livelihoods

1. Introduction / Background

The project Indigenous Knowledge Bank (IKB) is a component of the programme “Capacity Development for Adaptation to Climate Change and GHG Mitigation” (C3D+). “Repertoire of Traditional indicators for seasonal forecast and prediction” is one activity of the IKB. This project on “Indigenous Knowledge Bank” is being implemented in a context where the international community is recognizing the contribution of local knowledge in the conservation of resources and in sustainable development efforts. However, the main challenge associated with the use of this type of knowledge stems from the fact that it is transmitted orally from generation to generation and may be difficult to capture.

a. Objectives:

- Identify and document indigenous knowledge in adaptation and vulnerability;
- Improve the database and create an information exchange block on indigenous knowledge of climate and development;
- Contribute to reducing the gap between indigenous knowledge and scientific knowledge to encourage a better integration of indigenous knowledge in adaptation to climate change plans and strategies at different levels for sustainable development.

b. Anticipated outcomes:

In this activity dealing with the repertoire of traditional indicators for seasonal forecast and prediction, the anticipated outcomes are:

- Some traditional indicators for seasonal forecast and prediction are documented, interpreted and shared;
- Production of a film: Role of seasonal traditional climate prediction "the Xoy";
- Capacity building of local community;
- A joint publication between ANACIM ENDA in traditional indicators for seasonal forecast and prediction

2. Methods brief
• Selection of the site, identification of the area (in cooperation with ANACIM): Kaffrine, a highly agricultural area in the groundnut basin of Senegal
• Development of an interview guide
• Consultation with stakeholders (Farmers, support services)
• Focus group and interviews for exploring identified indicators in depth
• Retained indicators (Frequency, Relevance)
• Interpretation of science and publications

3. Results to Date:

With community we have identified indicators of seasonal trends including the quality and quantity of rain available for sowing "Thiebo" and prediction of the end of the season. These indicators can be astral, vegetal, animal, and physical.

-Astral Indicators
  - Observation of clouds / stars having the shape of an elephant
  - When the clouds turn from black in colour to whitish in short intervals

-Plant Indicators
  - The flowering of many species of trees such as the Néré, dimb, tamarind, baobab. Those trees become leafy when the rainy season draws near...

-Animal Indicators
  - The songs of a bird that calls men to go to the fields and asks women to stay at home
  - Reproduction of grey lizards (as they must lay their eggs in water)
  - Appearance of butterflies
  - Type of building done by ants
  - Physical Indicators
  - Wind changes direction / wind that brings rain
  - Temperature increases

4. Lessons Learnt

a. Important Role of traditional seasonal prediction;
b. There is a consensus among farmers in the forecasts of the raining season by observing natural phenomenon such as the blooming of baobabs;
c. Progressive loss of indigenous knowledge ...
Case Studies Under Good Practice Theme #4. Equitable climate information and advisory services: How to ensure that climate services reach women and other socially- and economically-marginalized groups?

Theme 4 Case Study #1: Demonstrating the Value of Climate Services in Senegal and Kenya: Results of the ANACIM—Red Cross collaboration to communicate short-range weather advisories to women in Kaffrine, Senegal: Identification of gender-specific needs in climate services

Duration: 2011 - 2012
World area covered: Kaffrine, Senegal
Number of farmers touched: determined
Lead organization: Agence Nationale de l’Aviation Civile et de la Meteorologie du Senegal (ANACIM)
Partners in implementation: Red Cross Senegal, UK Met Office, HFP-King’s College London, University of Liverpool, University of Reading.
Funded by: CCAFS, Humanitarian Futures Program/King's College London, CDKN.

I. Project highlights/successes:

- Very clear understanding of user requirements
- Created demand for these services- demanding community customers clarifying their needs from one season to another, calling Red Cross relay to ask where the forecast us
  a. Underlying measure that this makes a difference in their lives and is now a need.
- Transferred knowledge and capacity, to understand end user needs on the one hand and to access, utilize and make use of climate science and information
  o Awareness creation and outreach
- Farmers able to clearly make informed decisions to improve their livelihoods, in anticipation of forecasted climate conditions
- PAR design of project activities: Redesigned and re-steered action according to farmer expressed needs
  o Started with farmer information needs,
  o Developed climate products in collaboration and consultation with farmer communities
  o Built in channels for community feedback and continued evaluation of salience of products to meet their needs.
- Exchange with Kenyan colleagues provided opportunity to learn around similar challenges and successful solutions employed kilometers away to overcome challenges to successful climate risk management at the community level
  o In the Kenya component of the project, the use of a grassroots organization with volunteers based at the community level (Christian Aid) to relay information to communities, developing active relationship between Met Office and NGO
  o In Kenya, SMS based dissemination through an SMS platform called , a big phone with a SIM able to send out at once an SMS to a contact list of xxxx farmers

Duration:

World area covered:

Number of farmers touched:

Lead organization:

Partners in implementation:

Funded by:
- Local indicators: assessment of how local indicators become relevant for farmers to make decision under new climate conditions
- Built long lasting collaborations between met office and boundary organizations:
  - MoU between Senegal Met Office and Red Cross signed in July 2011
  - Samuel Mwangi, Kenya Met Office: I consider Christian Aid humanitarian workers, not as workmates, but as friends

I. Introduction/Background:

Disaster risk management is the most important in CCA for rural communities in Africa.

1. The project dealt with forecasting uncertainty by providing continued forecasts through the season (seamless forecasting), specifying the seasonal outlook throughout the season
2. Working with 3 farmer communities, Dioly Mandakh, Malem Thierign and Fass Thiekeen, in CCAFS Research site of Kaffrine
3. Use of a grassroots organization (Red Cross) with volunteers based at the community level to relay information to communities, developing active relationship between Met Office and NGO (1st MoU signed between Senegal Met Office and a grassroots organization)
4. Focus on the specific climate service needs of women and other socially marginalized groups- all research and questionnaire protocols gender – disaggregated
5. SMS based dissemination to a contact list of community leaders/entry points during 1st season, community evaluation at end of season 1 enabled us to re-steer course and utilize new communication channels proposed by communities themselves to increase their access to climate information

Proposed innovations to maximize reach and access included:
- SMS not only in French, but also Wolof and Arabic
- Forecast blackboards installed in strategic outposts across the community
- Publicly Designated Community area relays, to ensure information / alerts for severe weather reach all parts in the community

6. In order to be reached with information, Women and other social marginalized groups need specific communication channels. Proposed outlets included:
   a. Borehole
   b. Petty sale trade points
   c. SMS on their or the cell phones of their children

7. Place specific: From one community to another, within a radius of km, communication needs differed. One village favored the mosque, whereas another would not.
From season 1 to season 2, access to climate services went from a handful of community members (in one of the communities only 3 members had received information) to 100% of sampled respondents, through use of community proposed salient communication channels

8. Salience of products: feedback at the end of season 1 had communities request the following additional products:
   a. Onset
   b. Cessation- for women
   c. Interpreted Seasonal outlook, with rural advisory

9. From season 1 to season 2: new products added, through partnership between Senegal Met Office and UK Met Office
   a. Seasonal rainfall outlook + advisory (involvement of the local agricultural extension officer)- a major innovation and recommendation: Need to bring together all the technical expertise in a coordinated forum to deliver weather based advisories to rural farmers
   b. Update to the seasonal forecast

10. Rain gages and community logs distributed in June 2011 built credibility and enabled communities to have a stake in improving forecasting

11. Community Entry and Trust facilitated by:
   a. An opening EWEA workshop that brought climate/weather forecasters at national and regional levels face to face with village leaders/entry points, explaining the science and limitations, training on how to use climate information
   b. Community rain gages manned by the community themselves to enable communities to take charge of downscaling forecasts for their communities, and enable them interpret forecasts for their use.
   c. Avenues for community feedback to Met service providers:
      i. Daily contact between rain gage keeper and the Met Service regional officer to provide feedback on received forecasts and give rain gage measurement, contributing to improved data and giving local gage keeper a stake in the (as a public good to be preserved by all)
      ii. Community feedback log- contributing to advancing world knowledge on the usefulness of climate services.

II. Recommendations for Up-Scaling

- SMS based dissemination effective (SMS in local language)
- Address forecasting uncertainty by providing continued forecasts through the season (seamless forecasting), specifying the seasonal outlook throughout the season, enabling farmers to adjust to uncertainty
- Treat community members as community based customers to serve with climate services
  o Identify salient communication channels to enable community access to climate information, keeping in mind place specificity and heeding the particular climate service needs (both in terms of products and
communication channels) of women and other underserved vulnerable groups
  o Continually assess the salience and relevance of both communication/delivery channels and products delivered to meet needs of community based customers of climate services

- Bring in grassroots organization from the humanitarian sector and civil society with strong presence and community-based volunteers (such as the Red Cross, World Vision, Christian aid), as effective relays of climate information to community members

- Involve communities and give them a voice in the process of climate service production
  o Participatory project design (VCA process)
  o Project launch through opening face to face meeting between forecasters community climate service customers (EWEA workshop)
  o Rain gage measurements and community feedback

- Need to bring together all the technical expertise available (met, agriculture, health, livestock) in a coordinated forum to deliver salient weather based advisories to rural farmers throughout the season- reinvigorate the GTP in Senegal

- Build demand for climate information through demonstration: PAR model recommended, start with pilot sites, assess through community evaluation at the end of each season assess salience of communication channels and products

**Theme 4 Case Study #3: Rockefeller Regional Project on Agro-met advisory to farmers—Ethiopia results**

**Training of Trainers on Weather and Climate Information and Products for Agricultural Extension Services in Ethiopia**

**Duration:** January 2010-

**Area covered:** Ethiopia

**Number of farmers touched:** More than 780 (direct)

**Leader organizations:** Ethiopia’s National Meteorological Agency (NMA)

**Partners in implementation:** Ministry of Agriculture and Rural Extension Service, World Food Programme, AGRA, Oxfam America and other relevant government and civil society stakeholders.

**Funded by:** Rockefeller Foundation

**Most important lessons learnt:** Working closely with the farmers is important to successfully service their information needs and support adaptation and food security

1. **Introduction**

a. **Rationale**
This project is funded by a Rockefeller Foundation (RF) Grant Agreement. It was based on the experience and success of the WMO Roving Seminar Programme in West Africa and other African countries, in particular Mali, on the application of Agro-Meteorology to directly assist farmers in making operational decisions. It was the result of collaboration between WMO, the National Meteorological Agency of Ethiopia (NMAE) and the Ministry of Agriculture of Ethiopia.

Based on these experiences and feedback from the various institutions in Ethiopia, especially from the Ministry of Agriculture, the focus of this project is to “train the trainers” in Meteorological and Agricultural Agencies to familiarize Agricultural Extension services in the use of weather and climate information that NMAE provides and in their further application in operational farm management. It has also been recognized that the incorporation of a more participatory, cross-disciplinary approach that brings together research and development institutions, relevant disciplines, and farmers as equal partners to reap the benefits from weather and climate knowledge brings significant benefits for food security and livelihoods of farmers.

There are 26,000 Agricultural Development Agents (DAs) in Ethiopia and approximately 600 administrative districts. Provision of individual training to such a large number of extension agents is an impossible task. Hence a “Training of Trainers” approach was taken to train 30 extension agents in each of ten regions in Ethiopia as a starting point. These seminars also increase the interaction between the local agricultural extension services and the local staff of the National Meteorological Agency of Ethiopia. This link is crucial for NMAE in providing better services for the agricultural community.

The NMAE collects data at more than 200 weather stations across Ethiopia on daily basis. These data are transmitted to the agency’s central office for analysis. The consequent information produced by NMAE includes daily weather reports, 10-day weather summaries and 10-day forecasts, monthly weather summaries and 1-month forecasts, and three seasonal forecasts a year covering the two rainy seasons and the dry season. The service also provides rainfall maps showing rainfall received as a percentage of normal rainfall, vegetation conditions, and impacts on crop and livestock production.

b. Objective

The objective of the programme is to provide better practical knowledge of agro-meteorological services and applications to farmers in order to improve farming practices and increase or secure agricultural production.

c. Expected outcomes

- Institutionalize the links between the agricultural extension sector and the NMAE and to put in place a mechanism for a routine weather and climate information provision to the agricultural extension sector and to obtain their regular feedback to NMAE.
- Raise the awareness of the agricultural extension services about the current advances in the provision of weather and climate information for facilitating operational decisions in farming.
- Get regular feedback from the agricultural extension services and re-design more targeted information products and improve the channels of communication to provide information to the farmers.
- Development of improved risk management guidance tools for the farming community.
2. Methods

- Creation of national consultative forum for NMA and Ministry of Agriculture
- Training the extension services workers, agrometeorologists, meteorological observers and district SMSs.
- Disseminate Plastic rain-gauges (based on cost sharing scheme) among model farmers
- Train model farmers on how to read and register rainfall records from plastic rain gauge and make use in deciding the sowing and other agricultural activities
- Avails dekadal weather forecasts for the agricultural extension agents and SMS

3. Results to date:

a. Consultations between WMO, NMAE and the Agricultural Extension Service.
b. Weather, Climate and Food Security Working Group established, hosted and Chaired by the General Director of NMAE and meets regularly.
c. At a country level, a Steering Committee consisting of members from Ministry of Agriculture Extension Directorate and NMAE was also established which in turn has established federal level technical Task Forces consisting of staff NMAE Agricultural Meteorology and Meteorological Forecast and Early Warning Directorates.
d. At a region level, Steering Committees have been established by the NMAE for each of the nine Regions in collaboration with Ministry of Agriculture Extension Directorate, Branch Meteorological Directorates, Regional and selected Districts’ Agricultural Extension Bureaus, meteorological observers at or near the selected districts stations,
e. Fourteen target districts in nine Regions have been selected based on the agro-climatic characteristics and presence of or proximity to meteorological stations for the project implementation.
f. Many rounds of Training of Trainers (TOT) were carried out involving 387 Principal Agents (PAs), 783 Agricultural Development Agents (DAs), 130 Subject Matter Specialist (SMS), and 783 selected farmers a total of 1696 participants.
g. Agricultural Development Agents and Agricultural Specialists working together to provide farm level weather and climate information to the agricultural extension services.
h. Distribution of Plastic Rain Gauges and Training of Farmers in their use: involvement of the farmers in measuring rainfall on their plots of land to aid them in decision-making regarding when to sow their crops, when to apply fertilizers, and also for the implementation of rain water harvesting. Each selected District distributed eighty rain gauges (a total of 880 rain gauges) to help farmers.
i. A total of 7000 plastic rain gauge produced and more than three thousand distributed mainly to farmers and NGOs. The demand and use for the plastic rain gauge is rising.
j. Institutionalizing the relationship between NMS and Ag Extension for ongoing delivery of weather information
k. Post Evaluation in a sample of the villages serviced by the trainees from the Agricultural Extension Services

The post-harvest evaluation was conducted by the NMAE and MOA.

Evaluation method:

- Surveys of village leaders and extension officers in representative villages
• Meet with a number of the Extension Officers to capture their experience and lessons learned for improvement of training and information content.
• Collection lesson learnt from villages/households that obtained training from extension officers and from households that did not receive such training (controls) for comparison of benefits to evaluate the effect of the intervention.

Summary of outcomes:
• The number of users of climate information for agricultural practices have significantly increased
• The survey results showed that using the plastic rain gauge and agro-meteorological advisories improved yields.
• Ethiopian Agricultural Research Institute and Agricultural Transformation Agency have already put in place the use of agro-meteorological advisories over selected districts in Ethiopia
**Case Studies Under Good Practice Theme #5.** Is information enough? Integrating information with other interventions to enable farmers to reap the full benefits from early climate information and support effective management of climate-related risk at the farm level

*Theme 5 Case Study #1: WMO Roving seminars: the METAGRI project*

**Duration:** 2008-Current  
2008-2011 – METAGRI project funded by Spain  
2012-2014 – METAGRI-OPS project funded by Norway  
**World area covered:** Western Africa (15 countries)  
**Number of farmers participated (2008-2011):** 7300 (1000 women)  
**Lead organization:** World Meteorological Organization  
**Partners in implementation:** National Meteorological Services. Benin, Burkina Faso, Cape Vert, Côte d’Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal and Togo  
**Funded by:** AEMET (Spanish Meteorological Agency) from 2008-2011, Norwegian Ministry of Foreign Affairs (2012-2014).  
**Most important Lesson learnt:** The value of dialogue between information providers and users of that information.

1. Introduction / Background

The METAGRI project was developed by the World Meteorological Organization (WMO) based on previous experiences in the provision of weather and climate information to farmers including more than 25 years operating in Mali. The project spread over 15 Western Africa Countries and was executed at national level by the National Meteorological Service. Funds were provided by the AEMET (the State Meteorological Agency of Spain) through a Trust Fund at WMO from 2008 until 2011.

Weather and climate are some of the biggest risk factors impacting farming performance and management. Extreme weather and climate events such as severe droughts, floods, or temperature shocks often strongly impede sustainable farming development, particularly in the tropics and sub-tropics. Factors such as climate variability and change contribute to the vulnerability of individual farms and entire rural communities, with significant impacts on regional and global food security.

In this context, the World Meteorological Organization (WMO) is promoting the organization of a series of one-day Roving Seminars on Weather, Climate and Farmers in different regions of the world to sensitize them to weather and climate information and its applications in operational farm management. These seminars will also increase interaction between local farming communities and the local staff of the National Meteorological and Hydrological Services (NMHSs). This feedback is crucial for the NMHSs in providing better services for the agricultural community.

Based on the success of the METAGRI project and the final workshop meeting in September 2011, it was proposed that the METAGRI activities be made more operational especially with respect to using a crop model based on historical weather data to develop planting advice. In December 2011, the Norwegian Ministry of Foreign Affairs agreed to fund the METAGRI-OPS project for at least the next three years (2012-2014).
2. **Methods brief**

Roving Seminars are focusing on five main topics: climate variability and climate change, specific climate risk for agriculture in the host region, agro meteorology (products and tools), agronomic research and adaptation to climate change, and, finally, use of the so-called farmer’s rain gauge and methodology of rainfall and phenological observations.

At every seminar, a limited number of simple plastic raingauges are provided to the most skilful farmers, allowing them to measure rainfall in their plots. These rainfall measurements provide them an estimation of the soil moisture and could be used to make decisions in critical crop timing regarding when to plant and which variety of seed to use according to date, received rainfall, and expected character of the rainfall season. Those selected farmers also act as leaders in their communities by conveying weather and climate information and providing useful information to the national meteorological services and agricultural authorities about rainfall, weather phenomena, status of crops, pest and plagues occurrences or other aspects of crop evolution.

Training teams were multidisciplinary with meteorologists, agricultural extension agents and experts in agriculture. They liaise previously with regional authorities and convocate the farmers to a convenient meeting room in the agricultural area providing them transportation fees, coffee and tea, and lunch.

3. **Results to Date:**

A grand total of 159 seminars were held in Western Africa and 3325 raingauges were distributed. About 7300 farmers participated in the seminars. In addition, 800 additional agricultural extension farmers, local leaders, NGO staff, and local journalists were trained. It is estimated that at least one representative of around 3000 small rural villages has been trained and is able to use weather and climate information to improve their decision-making process in agriculture. Gender aspects are covered with around 1000 women receiving training. Nevertheless, representation of men and women is far from equal due to cultural aspects and there are strong differences from country to country and also inside every country.

Phase I of the project was conducted in Mali, Niger, Burkina Faso, and Senegal due to past experience performing Roving Seminars in these locations. Mauritania was added as a first newcomer to raise conclusions to extend to other countries. Phase II was the extension to other French/Portuguese Speaking countries with small or no experience like Cape Vert, Guinea, Guinea- Bissau, Togo, Benin, Gambia (English Speaking). Phase III extended the activities to Nigeria, Ghana, Cote d’ Ivoire and Liberia.

It was a great success and there were requirements to perform more seminars and to organize seminars in more regions of every country. Chad is now in a trial phase to joint METAGRI by also organizing some roving seminars.

4. **Lessons Learnt**

Raingauge design has to be improved in the attached plastic scale and developing a bigger version for Gulf of Guinea precipitations. An improvement in material would be also welcomed.
Improvements in communications to enable an easier exchange of data and products between farmers and meteorologist are needed. The use of local radios, mobile phone and the role of local leaders needs to be enhanced.

In some countries there is a need to develop or strengthen the Pluridisciplinary Working Group in Agrometeorology composed of agricultural authorities, food security officers, plant and animal health experts, researchers, and meteorologists. The importance of NMHS integration into the National Action Plans about Adaptation on Climate Change was highlighted.

There is a need to pay more attention to the role of the media as intermediaries between farmers and meteorologists, providing translation from the technical information to the local languages and to expressions that could be understood by the farmers.

Many of these lessons are being addressed in the current METAGRI-OPS project (2012-2014).

Theme 5 Case Study #2: Climate Forecasting for Agricultural Resources (CFAR) project, Burkina Faso: lessons learnt and challenges to replicability

**Duration:** 1998-2007  
**World area covered:** Burkina Faso (3 agro-ecological areas)  
**Number of farmers touched:** 160 directly, about 900 indirectly  
**Lead organization:** University of Georgia & Tufts University (US)  
**Partners in implementation:** Direction Générale de la Météorologie (DGM), Institute de l’Environnement et des Recherches Agricoles (INERA), Plan-Burkina  
**Funded by:** US National Oceanic and Atmospheric Administration, Office of Global Programs  
**Most important Lesson learnt:** If appropriately communicated, seasonal climate forecasts can be understood and used beneficially by African farmers

1. **Introduction / Background**

   a. **Rationale:**

   The Sahel-Sudan region of Africa is one of the poorest areas of the world. Livelihoods depend mostly on rainfed crop and livestock agriculture. In the late 1990s, advances in climate modeling enabled scientists to produce seasonal climate forecasts (SCF) for the Sahel-Sudan region with reasonable predictive skill.

   b. **Objectives:**

   The CFAR project sought to identify farmers’ information needs and entry-points for applying SCF in agricultural and livelihood decisions. The study spanned over about ten years that coincided with the establishment of the Climate Outlook Forum, known in West Africa as PRESAO (Prévisions Saisonnières pour l’Afrique de l’Ouest), a multi-stakeholder consultation process that brings producers and users of SCF together at the onset of the
rainy season. Though CFAR actively engaged in the PRESAO process and worked with the national meteorological services in the region, it must be noted that its mandate was not to support operational dissemination of SCF, but to carry out research to guide the scientific agenda. It did so by addressing two main questions: 1) What are the opportunities and constraints for farmers in the region to use SCF? 2) What are the best strategies for communicating SCF to them?

2. Methods brief:

The CFAR project was conducted in three agro-ecological zones of Burkina Faso, representative of the diversity of production and livelihood systems in Sahel-Sudan region: 1) agro-pastoralism in the north; 2) subsistence grain farming in the center, and 3) commercial cotton production in the south. With research activities spanning over several years, CFAR had the unique advantage of developing a strong rapport with institutional partners and local communities. The project unfolded in two phases. The first phase was based on participatory rural appraisals and semi-structured interviews with farmers and resource persons to understand a) local knowledge and perceptions of climate; b) management options and constraints faced by farmers; and c) information sources and networks that farmers trust and rely upon. The second phase entailed experimental dissemination of SCF to farmers at the onset of two rainy seasons and follow-up interviews to assess farmers’ understanding and use of such information.

The experimental phase centered on workshops involving extension agents, government officials, and traditional authorities, and a dozen farmers from each village, selected in concert with community leaders. The first part of the workshop aimed to facilitate farmers’ understanding of scientific SCF. Farmers were asked about traditional predictions and assessments of their accuracy. The scientific SCF for the upcoming season was then presented, followed by explanations about how it is produced and its limitations in terms of scale, timeframe, and parameters. Interactive exercises were conducted to help participants understand the probabilistic nature of SCF. During the second part of the workshop farmers worked in small groups to discuss potential responses and to devise dissemination strategies for their villages. In addition to the workshops, summaries of the SCF were broadcast on FM radio stations in local languages and printed on flyers, which were distributed in the villages. SCF updates were broadcast and disseminated by flyers as they became available. In each village, the project established 6-7 “farmer leaders” who managed a rain gauge to provide actual rainfall data that were fed back to the national meteorological service.

At the end of the farming season, semi-structured interviews were conducted with 160 farmers in 9 villages (3 per zone), divided between those who had participated in the workshops and those who had not participated to determine differences in knowledge and practices. Farmers were asked whether they received any SCF (either at the workshop or by other means); and, if they had, what did they understand; whether they shared the SCF with others; whether and how they used SCF in decision making; and how they felt about the outcome.

3. Results to Date:

Effect of participatory workshops: Interviews revealed that workshop participants were more likely to share the information with others, to understand the probabilistic aspect of
SCF and their limitations, to use SCF in making management decisions by a wider range of responses, and to evaluate the information more positively.

**Explaining probability:** Communication of probabilistic aspects of SCF requires some level of interaction (e.g. with extension or at workshops); it cannot be easily conveyed by short announcements through radio or mobile phones. During workshops, stories that related to everyday life were more successful than games and visuals (which led people to remember details but lose the message). Most of the farmers who attended workshops, compared with one third of those who did not, retained some notion of probability. An understanding of probability distribution (that some scenarios were more likely than others) was reported by half of the workshop participants and one third of non-participants. But only a few of the latter – compared to half of the former - understood the limitations of SCF, in terms of its timeframe, spatial scale, and specific parameters that can be predicted with reasonable skill. Over half of the participants and one third of non-participants recalled potential management responses identified at the workshop.

**Disseminating SCF:** Radio announcements by local FM stations are effective way of reaching rural communities: where broadcasting coverage is good they reached up to two thirds of farmers who did not participate in the workshop. However, social networks and informal exchanges at markets, shops, mosques, water fountains, group meetings, and social occasions were also found to be important forms of communication.

**Response strategies:** Though a timely SCF, delivered prior to the onset of the rains is ideal to enable farmers to plan, the fact that planting continues for several weeks means that even late SCF is better than none. The extended planting period helps farmers contextualize SCF in terms of their own observations of the rains. Choices of what, when, and where to plant were the most common responses. Farmers who participated in workshops enacted a wider repertoire of responses (2 or 3) than farmers who had not, most of whom reported one response.

Given the delay in the rains, most farmers expected an unfavorable season. Traditional indicators were for good rains, but the delayed onset made farmers doubt such predictions. Consequently, farmers were planning to abandon upland fields and more productive longer duration varieties and shift to drought resistant crops. The SCF helped farmers regain confidence in the prospect of a good season. Most farmers who reported changing strategies did so in anticipation of heavy rains, but did not entirely abandon drought preparedness options.

**Evaluation of SCF:** About half of farmers found the SCF useful in helping them be prepared, make decisions, adjust strategies, and prevent losses. Besides utilitarian considerations, farmers mentioned less tangible gains. They included expanding their knowledge base and feeling less anxious about the season ahead. These benefits are noteworthy, particularly as the onset of the rainy season is a time when farmers must work hard in harsh conditions, investing energies and resources towards uncertain production outcomes. Some farmers suggested ways of enhancing the utility of SCF, namely by delivering them earlier and by complementing them with technical advice and provision of inputs. Pastoralists also recommended producing forecasts that are more relevant to livestock management decisions.

4. **Lessons Learnt**

   **a. Lessons from success:**
**Dissemination and communication:** Dissemination of SCF should use a mix of media to reach rural communities, such as radio programs, printed materials in local languages, extension agents (where they are functional), and NGO workers. But it should also take advantage of social networks, public space interactions, community events, producer groups, etc. However, it is important to ensure consistency among messages disseminated by different channels.

Communication strategies must be consistent with the way farmers learn and share information, which privilege oral forms of knowledge transmission and experiential learning. Discussion of scientific SCF must be hinge on integration and respect of traditional knowledge. Group discussion encourages understanding by pooling the know-how of participants that have different levels of competence and exposure.

**Participatory approaches:** Participatory workshops at local level are effective in conveying SCF, explaining probability and forecast limits, and helping farmers formulate response strategies. However, participation is not a panacea, and even ‘participatory processes’ can be ridden with tensions and conflicts. As in the case of most resources, lack of access to information can further marginalize minority groups, poor farmers, and women.

**Capacity building:** Effective climate services require investments in capacity building at all levels. Locally, efforts to improve rural literacy will enhance farmers’ ability to understand and retain climate information; technical training in crop and livestock management will increase farmers’ options and promote sustainable household adaptations. At the provincial level, information sessions and distribution of resource materials to technical services, government administrators, elected officials, and NGOs would enable them to better serve as intermediaries.

Because some adaptive responses entail supra-local decisions and impacts across the landscape, participatory dissemination approaches should also allow for consultations and negotiations among the representatives of the relevant territorial and administrative units, including the traditional leaders as well as elected representatives of decentralized collectivities (rural Commune councils).

**Enabling policies:** Dissemination of SCF must be complemented by policies and programs that support farmers’ ability and flexibility to enact adaptive strategies. Such interventions should not be prescriptive of specific technologies or tied to specific agricultural commodities; rather they should propose a ‘basket’ of widely applicable options and enable farmers to understand, select, and adapt what best fits their conditions and priorities.

**Continuity of engagement:** SCF dissemination is facilitated by the project’s long-term engagement with local authorities, community leaders, and contact farmers through trusted local facilitators and multi-annual visits. Farmers commented that they were willing to take SCF seriously and help with dissemination because they knew the scientists would come back to see what happened and to help them understand and explain possible failures.

**a. Lessons from failures:**

**Challenges to reach the disadvantaged:** Despite the project’s commitment to inclusiveness, participant recruitment was influenced by dominant groups who, at times, sought to exclude disadvantaged groups (e.g. women, pastoralists, immigrants, lower castes, etc.).
Nonetheless, the mix of dissemination strategies used by the project resulted in SCF reaching at least two thirds of the farmers who did not participate in the workshops.

**Role of intermediaries:** The project had originally intended to test the role of intermediaries by training agricultural extension agents and comparing SCF use in villages where they did and did not intervene. This proved impossible because: a) neoliberal policies have reduced resources for extension so that it is barely functional except where supported by specific development projects. b) high levels of personnel turnover (trained agents were transferred elsewhere). Rather we found “farmer leaders” to be far more effective intermediaries in their own villages (though some of them shared information in ways that were not always equitable).

**Influence of powerful stakeholders:** More of a “challenge” than a “failure” was the presence of an agri-business that operated in one of the project zones, contracting out cotton cultivation to farmers. Needing farmers to grow cotton to meet its production quota, the company disseminated a misleading interpretation of SCF via radio and field agents to encourage farmers to plant more cotton. This led to confusion among farmers due to contradictions between messages coming from different sources. The risk of manipulation of information by vested interests must be taken into account in the planning of climate services. Yet, powerful actors cannot be neglected or excluded from the process; rather they need to be engaged in ways that encourage them to align their interests with being good corporate citizens.

**Theme 5 Case Study #3: Results of the Climate Learning for African Agriculture (CLAA) – CDKN project.**

**Duration:** September 2011 to August 2013  
**World area covered:** Africa regionally, with case studies in Sierra Leone, Benin, Uganda and Mozambique  
**Number of farmers touched:** not really applicable  
**Lead organization:** Natural Resources Institute, University of Greenwich  
**Partners in implementation:** Forum for Agricultural Research in Africa, African network for Agricultural Advisory Services  
**Funded by:** Climate and Development Knowledge Network  
**Most important Lesson learnt:** Agricultural research and advisory services have great potential to support climate adaptation, but the question of how to do this must be framed broadly, taking in “high-level” issues of climate policy, as well as “grassroots” issues of how and why to facilitate farmer participation.

1. **Introduction / Background**

   a. **Rationale**

   African agriculture needs to adapt to climate change and climate variability, but also faces opportunities to contribute to climate change mitigation and, more broadly, low-carbon growth. At the same time, agriculture is expected, by governments and now once more by development donors, both to provide food security, and to act as an “engine of growth.” In meeting these demands, African agricultural research and advisory services (we prefer the more general term “advisory services” to “extension) will be required to ensure the
dissemination and adoption of new agricultural technologies, whether these are generated anew, taken “from the shelf” of existing research, or sourced from farmers themselves. How now can research and advisory services respond given significant existing capacity and resource challenges? Are the changes required to achieve this a matter of gradual evolution, or a more fundamental transformation in relationships, roles and outcomes?

Our project does not directly concern “climate services” in the sense of the dissemination of seasonal forecasts or long-term climate projections, but its study of the opportunities for agricultural research and advisory services to respond to climate change, and the constraints on them doing so, should have strong lessons for climate services.

b. Objectives

The overall aim of the project is:

To assess through a shared learning process, for sub-Saharan Africa as a whole and for selected case-study countries, the extent to which agricultural research and advisory services (public, NGO and commercial private sectors) have incorporated climate considerations in their policies and operations, and identify practical strategies for making agricultural knowledge management, and thus smallholder agricultural development, in Africa more climate-compatible.

c. Anticipated outcomes of your project

- A shared understanding on climate compatible agricultural knowledge management amongst project partners (and other key stakeholders)
- An increased understanding of the extent to which ideas and practices connected with climate change are used in African agricultural research and advisory services
- Shared stakeholder learning processes, especially through existing FARA and AFAAS mechanisms in case study countries
- A shared identification of future pathways and practical strategies for improved agricultural knowledge management by African agriculture research and advisory organisations under CC

3. Methods brief

After further literature review, project activities started with an e-discussion for interested stakeholder throughout Africa, publicised widely by FARA and hosted through a FARA D-group. Following this, country case studies in Sierra Leone, Benin, Uganda and Mozambique have been launched, led by experienced national researchers/consultants. In each country there has been a preliminary survey, through document review and stakeholder interviews, of the policies and institutional contexts for the incorporation of climate issues into research and advisory services. This is being followed by in-depth study of particular projects, both “research” and “development”, funded by a variety of donors, that present interesting perspectives on agricultural innovation under climate change. These projects will be brought into contact with each other, and with national-level policy-makers in a series of workshops. Achievements in the four case-study countries will be disseminated to and discussed by a wider community of stakeholders across Africa.

4. Results to Date and Lessons Learnt:
The e-discussion early in the project demonstrated very clearly that the project’s key questions cannot be considered in isolation from broader questions: that participants were self-selecting with a bias to NGOs and individual researchers and that national managers of research and advisory services were largely absent does not undermine this. There was virtual silence on current good practice in incorporating climate considerations into agricultural research and extension, and instead participants focussed on:

- Climate justice
- The broader determinants of adaptive capacity in agriculture
- Governance of agricultural services
- The need for integration of agricultural knowledge with input supply and other services
- The innovative use of communication technologies
- Current controversies in agricultural development, particularly the use of GMOs.

The country case-studies are still in progress. Early results suggest that:

- Policy-making on agricultural knowledge management under climate change has largely fallen into the gaps between ministries of environment charged with climate policy and ministries of agriculture charged with questions of agricultural knowledge.
- National-level stakeholders ascribed relatively little importance to the provision of climate information.
- In each country there are several interesting local-level projects where farmers are involved in innovation processes that will assist adaptation to climate change. Some explicitly invoke climate change in their rationale and objectives, others do not. Those that do tend to base themselves on broad characterisations of current and future climate trends and climate uncertainty rather than specific downscaled projections.
- Many of these projects remain characterized by a “consultative” or at best “collaborative” approach to farmer’s participation in research: project staff and farmers remain focused on specific solutions rather building farmers’ own capacity for innovation (a “collegiate” approach).
- These projects tend to confront issues of supply of inputs, including credit, and market opportunities, as they affect farmers: responding to climate change accords with recent thinking on advisory services that the extension function should be co-ordinated with these other functions. This remains compatible with private sector involvement in input supply etc.; the issue is integration of different services and actors in local networks.

5. Additional Material

The project website is at [http://www.erails.net/FARA/climate-learning/climate-learning/](http://www.erails.net/FARA/climate-learning/climate-learning/). We plan to make more written materials available very soon.

**Theme 5 Case Study #4: Developing approaches to support smallholder decision-making and planning through the use of historical climate information, forecasts, and participatory planning methods**

**Duration:** Nov 2011–Jan 2013 Zimbabwe, Oct 2012–Dec 2014 (E & W Africa)
Area: Zimbabwe & Tanzania to date. Future work in Kenya & West Africa
No. of farmers touched: Tanzania (pilot) 250 so far; Zimbabwe 2,300 so far
Lead organization: University of Reading, UK.
Partners in implementation: Practical Action; AGRITEX (Zimbabwe); Tanzania Met Authority; Agricultural Research Institute (Tanzania)
Contact: p.t.dorward@reading.ac.uk
Funded by: Nuffield Foundation (Zimbabwe); CCAFS (Tanzania)
Most important Lesson learnt: Farmers have found a combination of historical climate data, forecasts and participatory planning approaches extremely useful for a) understanding causes of problems they face and b) planning changes to both their crop and livelihood activities

1. Introduction / Background

a. Rationale

Farmers want results from historical met. data & forecasts, together with tools to help their planning & decision making. Approaches that can achieve this are needed.

b. Objectives

1. To facilitate smallholders to make better plans and decisions and that utilise climate and weather information
2. To provide smallholders with analysed historical climate data (e.g. over 30+ years) so that they can clearly identify what is happening to their local climate & the effects on farming & livelihoods
3. To provide simple probabilities (risks) from historical climatic data that farmers can use for planning crop and livelihood activities in the next season(s) e.g. rainfall totals, successful planting dates, season lengths
4. To provide farmers with seasonal and short term forecasts
5. To introduce simple participatory planning and decision making tools that help farmers to explore scenarios and plan for the coming season(s) using the above information

c. Anticipated outcomes of your project: (1) 270 extension staff in Zimbabwe trained & able to roll-out training & approach in 3 provinces; (2) 25 extension & NGO staff trial approach with minimum of 500 farmers in Dodoma, Tanzania; (3) Approaches to facilitate smallholders to make better decisions & plans that better take into account climate & weather information evaluated & lessons learnt; (4) Scale up. Advice & technical support provided to organizations wishing to implement this approach in other countries / regions & funding for this obtained

2. Methods Brief
1. Before season – Analysis of historical climate data. To look for trends & calculate probabilities regarding:
   i. Temperature
   ii. Rainfall totals
   iii. Season start + end dates
   iv. Dry spells
   v. Extreme rainfall events
   vi. Distribution in season. Produce clear graphs for farmers & extension staff

2. Before season - Train extension / NGO staff in how to interpret & use the above with farmers

3. Before season - Participatory exercises with farmers. NGO/extension staff work with groups of farmers using resource allocation maps & crop calendars to plan crop management & livelihood practices for ‘good’, ‘normal’ & ‘bad’ seasons. Also jointly consider analysed historical data, probabilities (e.g. rainfall totals) & SCF & El Nino/La Nina forecasts for planning

4. During season – Provide updated SCF to farmers & short-term (e.g. 5 day) forecasts by SMS

5. After season - Review experience. Identify improvements in process for next year

3. Results to Date

a. Analysed historical climate data for sites completed to date¹ provide surprising & important findings. See below for an example of total annual rainfall for one site in Tanzania.

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Main findings that are generally consistent across sites analysed to date:

- Temperature is increasing
- There are no discernible trends in rainfall season totals, start / end dates, distribution in season, dry spells, rainfall events

This is important as if climate change is understood to be the main cause of reduced yields (when in many areas it may be due more to other factors e.g. declining soil fertility), farmers & support agencies may promote inappropriate strategies.

b. Farmers found participatory planning methods extremely useful to identify & compare different crop management and livelihood options they could use for the next season(s). There is evidence that farmers have used different strategies on their farms as a result
c. Farmers found analysed information very useful for decisions – e.g. rainfall, season lengths
d. Farmers estimated probabilities for next season easily e.g. of total rainfall amounts, start dates
e. In Zimbabwe community & household vulnerability assessment & action planning was successfully included as part of the activities

4. Lessons Learnt

a. Lessons from success

i. Good practices to replicate/scale up. All the above worked well and warrant scaling up
ii. Models / avenues for scaling-up. 1. Analysis, interpretation and use of historical data for all stations are a priority & require effective partnerships between key organisations.

2. Participatory work by extension / NGOs with groups of farmers is essential in year one. From year two, to facilitate scaling up, facilitators work with new groups whilst existing groups receive information & support via mobiles.