

# HOW TO SUPPORT USERS' UNDERSTANDING AND USE OF WEATHER/CLIMATE FORECAST AND SERVICES IN GHANA

## WORKSHOP REPORT

By

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**1- Day Stakeholder Workshop held at Modern City Hotel, Tamale – Ghana**

**6<sup>th</sup> August 20**



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## **ACYRONYMS**

<b>ACDEP</b>	Association of Church-Based Development NGOs
<b>ACMAD</b>	African Centre of Meteorological Applications for Development
<b>CRS</b>	Catholic Relief Services
<b>CSIR</b>	Council for Scientific and Industrial Research
<b>EPA</b>	Environmental Protection Agency
<b>GCRF</b>	Global Challenges Research Fund
<b>GMet</b>	Ghana Meteorological Agency
<b>IITA</b>	International Institute of Tropical Agriculture
<b>IWAD</b>	Integrated Water & Agricultural Development Ghana Limited
<b>KNUST</b>	Kwame Nkrumah University of Science and Technology
<b>MC</b>	Master of Ceremony
<b>MOFA</b>	Ministry of Food and Agriculture
<b>NADMO</b>	National Disaster Management Organization
<b>SEED CO</b>	Ghana Seed Company
<b>SEND</b>	Social Enterprise Development Foundation
<b>SNV</b>	Netherlands Development Organisation
<b>SWIFT</b>	Science for Weather Information and Forecasting Techniques
<b>TRUWAYLIF</b>	Transforming Rural Women and Youth Life Foundation
<b>UKRI</b>	United Kingdom Research and Innovation
<b>UoL</b>	University of Leeds
<b>WFP</b>	World Food Programme

## **1. Introduction**

This document is a report of the workshop aimed at “supporting users understanding and use of weather/climate forecast and services in Ghana”. This workshop was a follow-up to an earlier national workshop held in Accra in November 2018. The workshop was organised by Ghana Meteorological Agency (GMet), in collaboration with Kwame Nkrumah University of Science and Technology (KNUST), Ghana; University of Leeds, UK and the African Centre for Meteorological Application for Development (ACMAD), Niger. The workshop was organised as part of a research and capacity building project called African Science for Weather Information and Forecasting Techniques (GCRF African SWIFT) funded by UK Research and Innovation’s (UKRI’s) Global Challenges Research Fund (GCRF). The workshop was held on August 6<sup>th</sup>, 2019 at Modern City Hotel in Tamale, Northern Ghana .

## **2. Objectives of the workshop**

The aim of the workshop was to bring together users and producers of meteorological information to:

- Build common understanding of current forecasts and weather products,
- Understand how the users make use of the forecast
- Identify the barriers to the uptake of weather forecast
- Provide users with the basics of impact-based forecasting
- Help users to identify key hazards in their various sectors to facilitate the development of impact tables for such hazards.

## **3. Program overview**

This one-day workshop brought together 37 participants from different decentralised Government institutions, international organisations, experts working on different projects in the agriculture and livestock sectors, disaster risk reduction, International NGOS, Common Initiative Groups in the agriculture and livestock sectors and farmers. All participants who took part in the workshop were from Tamale and its environs. The workshop was facilitated by GCRF SWIFT partners from GMet, KNUST, UoL AND ACMAD.

## **4. Opening ceremony**

The workshop was opened with short remarks by Mr Lankuu Festus, from the Ministry of Food and Agriculture, department of agriculture. This was followed by self-introduction

and expectations of the participants. Dr. Elias Nkiaka from the University of Leeds was the MC for the opening ceremony. Dr. Philip Antwi-Agyei from KNUST gave a brief presentation on the general overview of the SWIFT project, what the project aims to achieve in Africa in general and Ghana in particular, it also highlighted the key areas that SWIFT is working on and the reasons of organising another users' workshop in Tamale. Philips presentation articulated on the following points:

- Funding over a period of four years (2017-2021) for £7.8M
- Targeted countries: Senegal, Ghana, Nigeria, Kenya
- 10 African and 6 British institutions, plus WMO
- 12 scientists based at the University of Leeds and Reading
- 03 scientists based at ACMAD
- 01 full time scientist based at the University of Nairobi

The overall goal of the project is to:

- 1) Build capacity within African forecasting agencies and improve communication links to forecast users in 4 countries -Ghana, Kenya, Nigeria and Senegal.
- 2) Improve tropical forecasting ability on hourly and seasonal timescales
- 3) Assist African partners to develop capacity for sustained training of weather forecasters.
- 4) Translate results to the wider developing world.
- 5) Benefit African populations, public and private sector organisations

#### **4.1 Expectations of workshop participants**

- Receive current weather and climate information
- Gain a better understanding of weather/ climate change
- Things to do to mitigate climate change
- Weather advisory for farmers
- Get more information on weather and climate
- How to enhance the dissemination of weather and climate information
- How to improve weather/climate services
- Where and how to find weather/climate information

- Learn from other participants collectively how to effectively use weather and climate information for decision making
- How to access various options available for obtaining weather/climate information
- Enrich knowledge on early warning
- Understand communication strategies for of getting weather/climate information to farmers
- Understand climate variability on water resources
- Check data availability

## **5. Weather and Climate Service Products Provided by GMet**

Miss Maureen Abla Ahiataku from GMet gave a presentation on the current weather and climate products provided by the agency. Her presentation focused on the different types of forecast products that GMet develops, forecast timescales, sectors and the different channels through which the agency uses to disseminate forecast to end users. Her presentation also highlighted the challenges faced by GMet in disseminating forecast to the general public regularly. The presentation also touched on the different formats that are used in disseminating forecast to different sectors. Mr. Bashiru Yahaya, a meteorologist from GMet was present and supported in answering of questions as well as facilitating group discussions.

## **6. Technical sessions**

Maureen's presentation was followed by breakout sessions to build a common understanding and stakeholder use of the weather forecast products provided by GMet. This was later followed by Elias' brief presentation and group exercise on the development of hazard tables. Due to the high number of participants from the agricultural sector, agriculture was divided into two groups. However, the result from the working presented in this report is a combination of inputs from both groups. The other groups were disaster management and water resources management.

### **6.1 Summary of building common understanding of current forecast produced by GMet**

The results presented here are based on the questionnaires completed by the workshop participants from the agricultural, disaster management and water resources sectors.

#### ***i. How forecast information is currently accessed?***

Forecast information mostly obtained through the following channels:

- Radio (e.g. Farm Radio), Television
- SMS e.g ESOKO
- Farmer to farmer exchange
- Social Media (WhatsApp) limited to those with smartphones
- Indigenous knowledge
- Farmers do not always have access to seasonal and monthly weather bulletins issued by GMet
- Seasonal and monthly weather bulletins for decentralised government services in Tamale
- Special administrative correspondence from the GMet head office to regional disaster management organisation when specific high impact weather events are forecasted for the region.

**ii. *Is it understood/trusted?***

The information is understood especially by experts not trusted because of the following reasons

- Sometimes the forecast information provided is not accurate as the forecasted event may not occur or occur with a significant lag time.
- Sometimes the forecast warnings are issued late when the event has already passed.
- Forecast provided often lacks clarity, spatial distribution of precipitation not always clear.

**iii. *Is it currently useful?***

Most of the participants indicated that forecast information received was generally very useful

**iv. *How is it useful?***

According to the participants, usefulness of the forecast information was sector specific and on the kind of forecast received.

In the agricultural sector, agricultural extension officers used seasonal forecast to advice farmers to plan their farming activities like choice of plot, field preparation and choice of crop to plan.

10-day forecast were used to plan farming activities like planting, weeding, application of fertiliser, harvesting, purchase of fodder for pastoralist, planning transhumance destination.

In the disaster management sector seasonal forecast were used to identify zones that could be affected by disasters such as droughts, flooding, disease outbreak and if possible launch early appeal for assistance from the central government. 10-forecast were used to pre-position disaster relief materials, send out early warning signals, train volunteers to help assist during a disaster such as flood, prepare where to keep disaster victims in case of evacuation, 3-day were used to send early warnings, identify the areas that were at risk especially for flooding while real forecasts were used for evacuation.

In water resources management sector, seasonal forecasts are used for planning long-term dam management operations. 10-day forecasts are used to send early warnings to the population living downstream of dams while 3-day forecasts are used to plan dam release operations. The dam managers usually carryout their operations in collaboration with the national disaster management organisation.

**v. *Is the uncertainty about the forecast made clear?***

The language used by forecasters is very technical and cannot be understood by most people. Forecast uncertainty are provided in formats that cannot be easily understood by non-professionals. The forecast does not usually provide location specific information making it difficult for people to trust the forecast. Sometimes events that are forecasted either occur earlier or later than what was forecasted. GMet does not always update the forecasts to inform the users if there have been or will be changes in the forecasts provided making it difficult for people to trust the forecast.





Figure 1: Frank Baffour - Atta facilitating one of the sessions with participants from the agricultural sector.

## 6.2 Identification of weather related high impacts events, primary and secondary hazards caused by these events and the impact severity and impact probability

(summary)

Event	Primary Hazards	Secondary Hazards	Tertiary Hazards	Impacts severity (cost, people, reputation)	Impact Probability (likelihood)
<b>Sector: Agriculture</b>					
Tropical rain storms	Heavy rains	Floods Soil erosion Leaching Logging of plants Siltation of irrigation reservoirs, lakes by sediments	Destruction of crops, livestock and properties, Loss of lives and livelihoods, Loss of biodiversity, Increase food insecurity Loss of soil fertility/nutrients Reduce capacity to store water for irrigation	High	Medium
Droughts	Low rainfall Loss of soil moisture Drying of water points and reservoirs Reduction in crop and fodder	Increased prevalence of livestock diseases and crop pest Reduction of livestock productivity	Loss of livelihood Loss of human lives Increased livestock mortality Loss of biodiversity Land degradation Increase food insecurity	High	High
<b>Sector: Water resources management</b>					
Tropical storms	Heavy rains High winds Lightning and thunder	Flooding  Siltation of dams	Dam failure Loss of lives and properties Destruction of power and telecommunication lines Destruction of roads and bridges Destruction of hydropower substation Reduction in dam capacity	High	High
Drought	Low rainfall	Low water levels in dams Water rationing	Reduction in hydropower production capacity	High	High

			increased prevalence of water borne diseases		
<b>Sector: Disaster Management</b>					
Bush fires	Destruction of crops/farms Destruction of livestock Loss of biodiversity	Shortage of food Loss of soil fertility	Generalise food insecurity Land degradation	High	High

## 6.4 Group mapping of stakeholders

Dr. Indasi from ACMAD introduced the after-lunch session on actions to reduce the impact of severe weather events in advance, and the current barriers to uptake of weather and climate information by first playing 'before the storm' game.

### 6.4.1 Before the storm: *A decision-making game designed to introduce the weather forecasts and possible actions to take against natural disasters through different roles*

This is a decision-making game developed by the Red Cross Red Crescent Climate Centre designed to introduce the weather forecasts and possible actions to take against natural disasters through different roles. The objective of the game is to win the most rounds by playing an action card from one's hand to best "match" that round's forecast card as chosen by the game's facilitator. Dr. Indasi asked for 4 volunteer players, while the other workshop participants participated in discussions after every round. Workshop participants learned about weather forecasts, making appropriate and timely decisions for different lead times. This game educates on the need to understand and use forecasts to take more meaningful action before a disaster happens.



Figure 2: Dr. Victor Indasi explaining 'before the storm' rules of the game to volunteer players and the participants.

#### 6.4.2 Summary of key actors involve in the dissemination of weather forecast by sector

Sector	Different stakeholders involve in disseminating forecasts from GMet
Agriculture	<p>Radio and TV stations, Religious gatherings, agriculture extension officers, NGOs, project implementing partners, social media and electronic mail (not available in rural areas), Traditional Authorities (Chiefs, Council of Elders), farmer networks, farmer to farmer</p> <p>At the institutional level: NADMO, MOFA, WFP, Volta Basin Authority, Red Cross, District Assembly and the members, National Fire Service, Catholic Relief Services, Telecommunication companies</p>
Water resources	<p>Ministry of Water and Sanitation, Volta Basin Authority, Water Resources Commission, Water Resources Institute, Hydrological Service Department, Irrigation Development Authority, Ghana Water Company, District Assemblies, Traditional Authorities (Chiefs, Council of Elders), Assembly members</p>
Disaster management	<p>GMet, Radio and TV stations, security services (police, fire service, NADMOD), District Assemblies, Traditional Authorities (Chiefs, Council of Elders), Assembly members</p>

#### 6.5 General Discussion and contributions

The last session of the day was dedicated to general discussion for participants to give their contributions on climate services can be improved in Northern Ghana. Most of the discussion centred only on what can be done by GMet and other stakeholders to ensure that forecast gets to the target end users. The participants recommended the following:

- 1) Avoid the use of technical terms when presenting forecast on radio or TV
- 2) Forecast should include the amount of forecasted rainfall.
- 3) The forecast need to be translated into language so that even those who do not understand English will benefit from the information

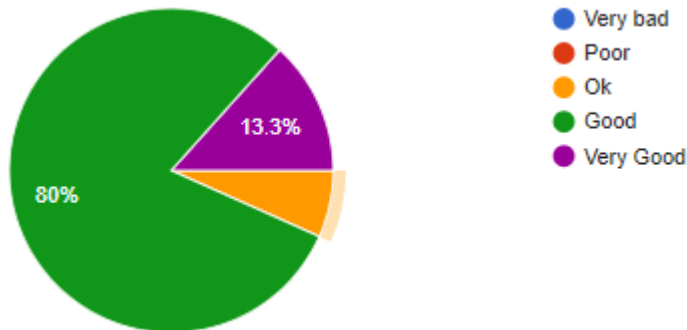
- 4) Seasonal and monthly weather forecast should be issued early so that farmers and other stakeholders who depend on this forecast for their different operations can plan well ahead of time.
- 5) Daily forecast should be accompanied by advice to the general public on how to stay safe.
- 6) Seasonal and monthly weather bulletins should also be sent out to farmers directly through agriculture extension workers. Seasonal forecast should come with some advisory notes for the farmers to help guide them in their farming operations.
- 7) Forecast presented over the TV should be regularly update so that the population is aware of any changes to the weather.
- 8) The broadcasters should increase the time allocated to weather presentation so that adequate explanation can be provided to the general public about the weather.
- 9) GMet should work in partnership with other media houses (radio, TV, print) to enhance the dissemination of forecast to a wider audience. A representative from the regional office of the National Communication Authority (NCA) of Ghana suggested that to issue or renew broadcast frequencies to media houses, the government is imposing the broadcasting of forecast information as of the conditions that the media houses must abide with before receiving their license.
- 10)Forecast for high impact weather events should indicate regions, localities that are most at risk to aid disaster relief operations.
- 11)GMet need to build users' confidence by providing accurate and timely forecast with appropriate spatial coverage.
- 12)Another major challenge was the distortion of forecast information when it has to go through many stakeholders to get to the desired target users. GMet should there find ways of getting forecast information to the end users directly.
- 13)GMet should reinforce their collaboration with the National Disaster Management Organisation so that information about high impact weather events can quickly be disseminated through NADMO since they have a robust network of disseminating disaster related information at the local level.

## **7. Workshop Reflections**

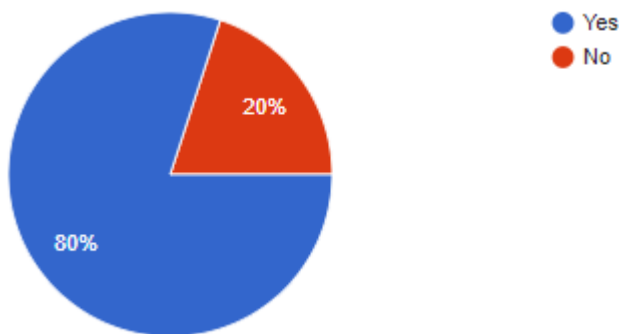
A survey to receive the feedback from workshop participants was administered through a google form. The survey was sent to all 31 participants through their email addresses and Maureen from GMet called most of the participants to remind them to complete the

survey but only 15 participants sent their feedback, which are captured in the figures below:

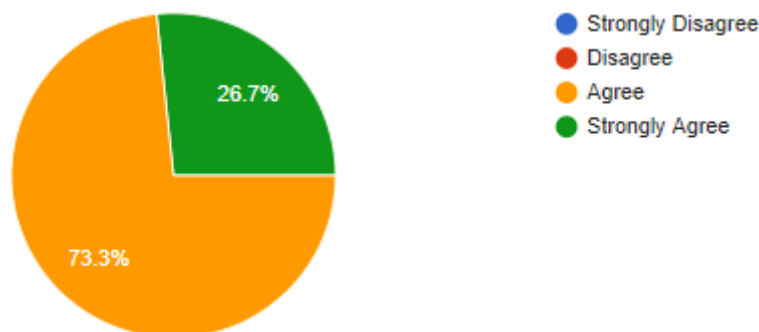
Question 1: How was the facilitation of the workshop?



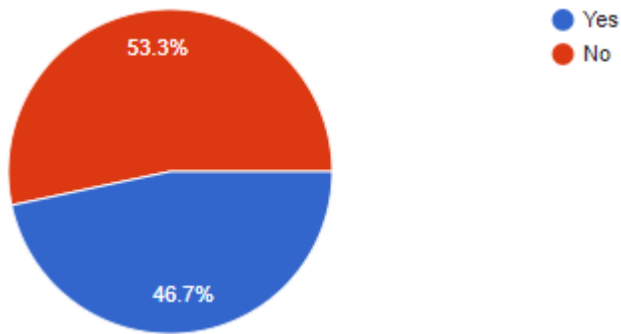
Question 2: Is this your first time participating in weather and climate services in Ghana?



Question 3: Do the presentations and group discussions help in your understanding of the workshop?



Question 4: Are there areas where you need further information?



Question 5: Specify the information if your response is “yes@ to question 4?

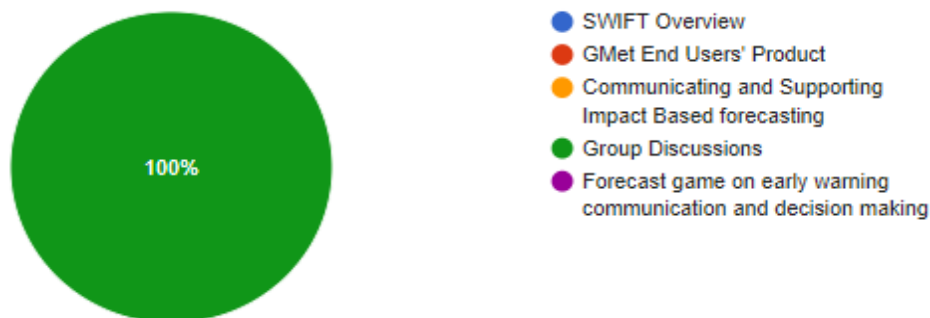
Warnings of impending drought situations
Prompt access to climate information for research
Drainage and irrigation
The information areas where most exhaustive but ma be timely delivery as well as expanding on the delivery medium
Souls and crop production technology
climate information

Question 6: How do you intend using learning from the workshop in your work or institution?



By not giving permit all put up projects that are on water log areas.
I intend to use the knowledge from the workshop to help farmers plan their season well
To provide weather information to farmers
By effectively communicating with beneficiaries of our agriculture interventions in decision making
For research
Information of the information will be cascaded to management
Help me design preferably times for farm activities
As an agriculture extension communication organization, the learning will be critical in communicating to our farmers and for planning purposes in terms of planting and drying of harvest.
i intend to share the knowledge on climate forecast which i acquired during the workshop with colleagues within the organisation.
i intend to share the knowledge i acquired during the workshop with colleagues within my organisation
For planning and scheduling of farming activities
Will share the learning points with my field staff
Will share information with farmers to help them plan their activities
organize re-orientation
Teaching others the knowledge I have acquired

Question 1: Which session did you enjoy the most?



## 8. Appendixes:

### 8.1 Workshop Program of Activities

Time	Activity	Lead Person
0830-0900	Registration	Frank and Maureen
0900-0945	<p>Introduction and expectations</p> <p>Opening by MoFA</p> <p>Overview of the SWIFT project and aims of workshop: proposed aims, individual hopes: what do we all hope to gain from the discussions</p>	<p>Participants</p> <p>Mr Lankuu Festus MoFA Regional</p> <p>Dr. Philip Antwi-Agyei</p>
0945 -1000	<p><b>Current weather and climate products and services provided by Ghana Meteorological Agency (GMet): Exploration of stakeholder use of weather information across sectors.</b></p> <p>The process of developing weather forecasts and alerts is time and data dependent. Use current bulletins/forecasts as examples to show</p> <ul style="list-style-type: none"> <li>- Where to find information</li> <li>- What information communicated</li> <li>- Who accesses it</li> <li>- Interpretation of message by sector e.g. seasonal forecast has inform for agri like planting dates, likelihood of rain (above normal; normal)</li> <li>- Constraints to the use of forecast information</li> </ul>	<p>Maureen Ahiataku</p> <p>Elias Nkiaka, Victor Indasi, Bashiru and Frank to support and facilitate</p>
1000- 1040	<p>User group exercise to determine</p> <ul style="list-style-type: none"> <li>-how information is accessed?</li> <li>-how is it used?</li> <li>-is information understood/trusted?</li> <li>-is information currently useful?</li> <li>-is the level of the uncertainties in forecast clear?</li> <li>-what/where can improvements be made?</li> </ul>	<p>Maureen and Bashiru to lead</p> <p>Elias Nkiaka, Victor, Bashiru and Frank to support and facilitate</p>
1040-1110	<b>Group Photograph and Break</b>	
1110-1200	<p><b>Communicating and supporting Impact Based Forecasting</b></p> <ul style="list-style-type: none"> <li>- Introducing impact based forecasting</li> <li>- Group exercise for the development of hazard tables</li> </ul>	<p>Dr. Elias Nkiaka to lead</p> <p>With support from all facilitators</p>
<b>Lunch 1200-1300</b>		
1300-1400	Group mapping of stakeholders who can take <b>action</b> to reduce the impact of severe weather events in advance, and the current barriers to uptake of weather and climate information.	

	Identification of stakeholders or recipients of information who have the ability to react to information provided (e.g. in the case of early warning systems)	
1400-1440	Rapporteurs from each User Group makes presentations on key findings	Victor/Elias/Frank
1440 -1515	Tea Break	
1515-1600	Plenary session <ul style="list-style-type: none"> <li>● What types of climate products and services do different types of decision makers require?</li> <li>● Can we quantify the uncertainties related these products?</li> <li>● What are the requirements for an effective collaboration between SWIFT and USERS for the production, packaging, communication and use of CIS information?</li> </ul>	Philip Antwi-Agyei to Chair

## 8.2 List of Participants

S/N	NAME	ORGANIZATION	MOBILE NO.	EMAIL
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32	FUSEINI SUMANI	FARMER	0559634421	
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