Report on National Survey on Weather Information Dissemination (WID) in Uganda

NORHED Project on: Improving Weather Information Management in East Africa for Effective Service Provision through the Application of Suitable ICTs (WIMEA-ICT)

December 2014

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Acknowledgement

1. Introduction

Makerere University is implementing a five-year project supported by NORAD under the NORHED programme. This project is titled "Improving Weather Information Management in East Africa for effective service provision through the application of suitable Information & Communication Technologies (WIMEA-ICT)". The other partners in this project are University of Bergen (UiB), University of Juba (UoJ) and Dar es Salaam Institute of Technology (DIT). Within Makerere University, the project is being implemented by a multidisciplinary team comprising of the University Library (Maklib), the Meteorology Unit under the College of Agricultural and Environmental Sciences, College of Engineering Design Art & Technology (CEDAT) and is coordinated by the College of Computing & Information Sciences (COCIS).

Makerere University invited the Uganda National Meteorological Authority (UNMA), formerly the Uganda Department of Meteorology (DOM) as a key stakeholder of the research project.

One of the project activities was to conduct a nation-wide survey on Weather Information Dissemination (WID) with a goal of the improving the quality, access and impact of weather information. Prior to the survey, as part of WIMEA-ICT project, a nation-wide baseline survey on the state of weather information records was conducted. It was envisaged that increased awareness will result in increased access/use, thereby complementing the efforts of the UNMA and related institutions towards meteorological data collection, management and dissemination.

Additionally, the results of the survey will inform the development of a weather dissemination system, which is also one of the project activities. The selected weather sectors will be a sample for detailed requirement elicitation for the development of a fully functional weather information dissemination system. This report also serves as input to the requirement specification of the weather information dissemination system.

The WID survey [attached as Appendix B] focused on key sectors that consume weather information. The sectors are highlighted in Table 1 below:

Table 1: Sectors for Survey Respondents

Sector	Contacts / Visited places
Agriculture	Ministry of Agriculture, NARO, Fishing sites, individual farmers
Aviation & Construction	Soroti Flying School, large construction companies
Disaster Management	Ministry of Disaster Preparedness, NGOs involved in Aid
Health Management	Ministry of Health

Defense	Ministry of Defense
Resource Management	Ministry of Energy, Ministry of Agriculture

For the sector of Agriculture, the Ministry of Agriculture, NAADs in Kawanda, Entebbe, Gaba and Nsangi landing sites were among the specific organizations visited for respondents who participated in the survey, together with randomly selected individual farmers and fishermen. Under Disaster Management, CARE Uganda, World Vision, ACTED, together with individuals in disaster prone districts such as Katakwi and Karamoja. The Soroti Flying School was visited for respondents of the aviation sector, while UMEME and National Water and Sewerage were contacted for the Resource Management sector. For the service-centered sectors of Health Management and Defense, the corresponding ministries were visited for respondents.

The sector of Tourism, although being one of those affected by weather, was not a part of the sectors considered for the survey.

A team of 10 researchers (see Appendix A) participated in the survey to investigate the state of weather information and dissemination system in Uganda. Data from the questionnaires subjected was analyzed using a spreadsheet program. Section 2 presents the results of the survey and section 3 the discussion arising out of the results. Appendices are presented as section 4 of this report.

2. Results

In this section, we present the survey results in 5 sub-sections namely i) the general information; ii) the channels of delivery iii) usage and accessibility of information; iv) packaging of Information; and, v) issues and recommendations.

2.1 General information about the sectors

This section captured general aspects of the respondents that participated in the survey, including their district of location, the sector or their major economic activity, age, and gender.

2.1.1 List of Districts covered

The research team collected data on access and usage of weather records from respondents in several districts. These included a total of twenty one disticts: Kampala, Luwero, Mpigi, Masaka, Katakwi, Karamoja, Ntungamo, Arua, Lira, Kasese, Wakiso, Jinja, Mukono, Kayunga, Buikwe, Soroti, Hoima, Masindi, Iganga, Mbarara and Kiruhura.

The focus and purpose of the survey was to visit the selected sectors, therefore the districts visited were representative of the sectors, for instance, Katakwi is known to be a disaster-prone

area, therefore the research team visited respondents in Katakwi under the sector of Disaster Management.

2.1.2 Sector coverage

The survey considered major sectors that are affected by weather in Uganda and grouped them into six categories. The percentages of sector coverage in terms of questionnaires returned are indicated in Figure 1 below:
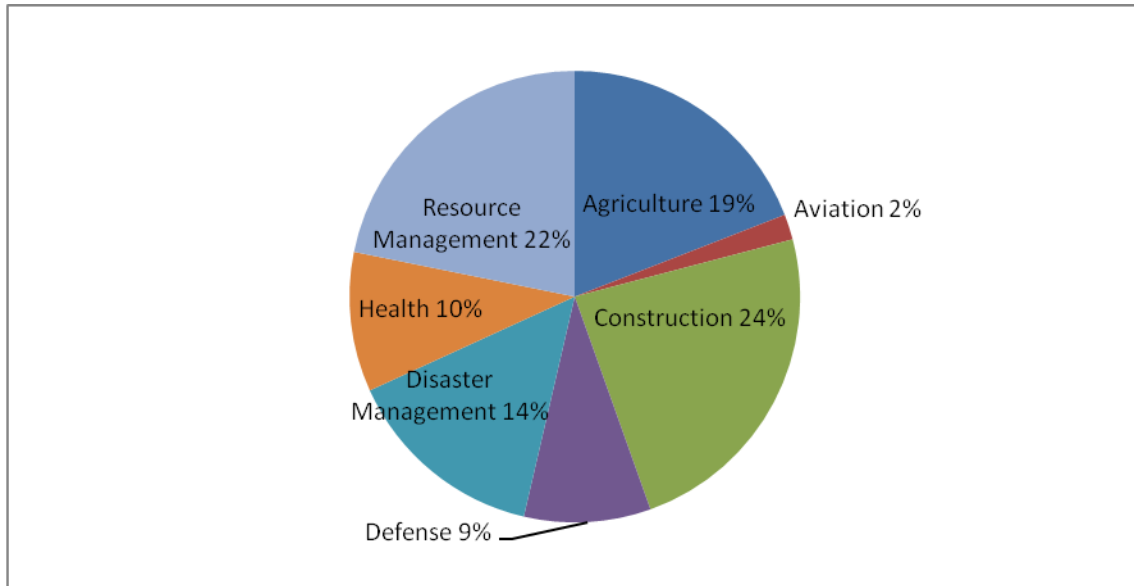
Figure 1: Sector Coverage

2.1.3 Respondents Age

The age group of 26-36 shows a bigger percentage (49%) of respondents who were accessed for inquiries on weather information. The graphical representation is as indicated in Figure 2. Comparing the ages of 18-25 (6%), 26-36 (49%), 37-47 (30%) and 48 and above (15%), the results also indicate that access to weather information generally reduces as the age increases. Figure 2 captures the number of respondents for each age bracket.

Figure 2: Age of Respondents

In terms of the selected sectors, Figure 3 shows the respondents' age brackets for all of the selected sectors.

Agriculture

- 18-25: 9%
- 26-36: 27%
- 37-47: 37%
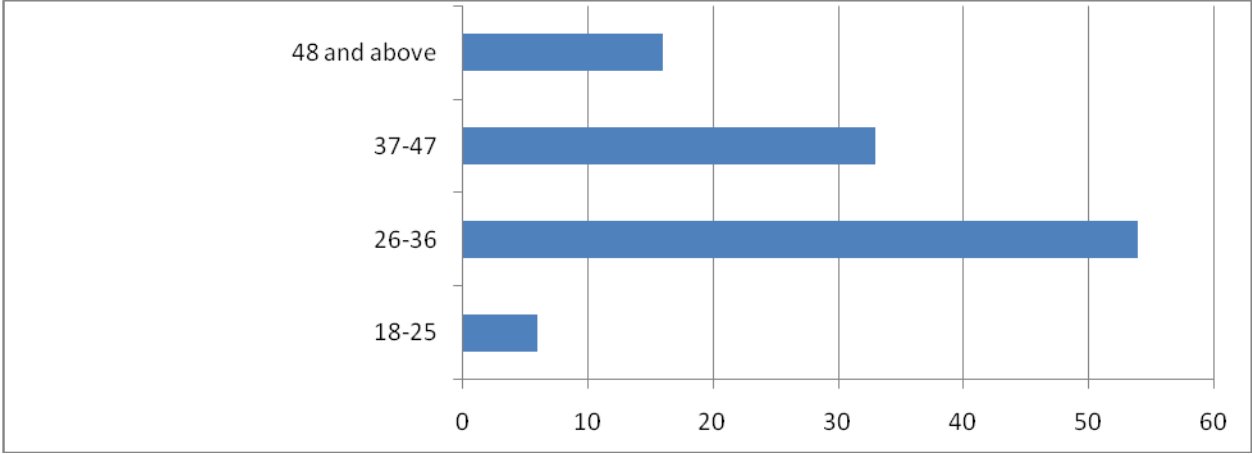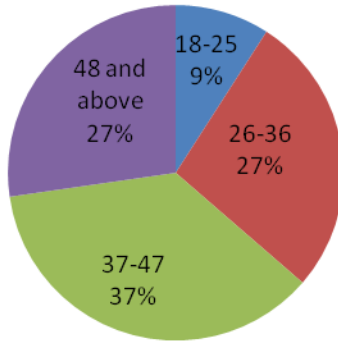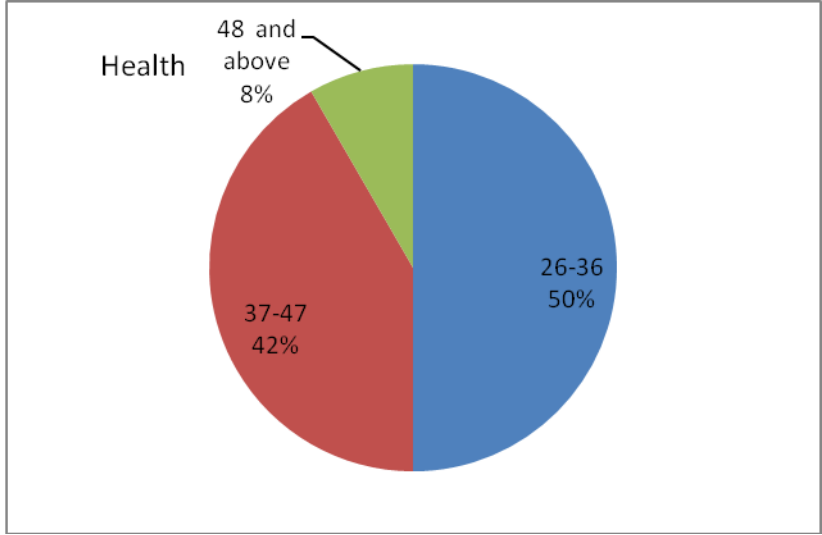- 48 and above: 27%

Health

48 and above 8%

37-47 42%

26-36 50%

2.1.4   Respondents Gender

Of the total respondents who participated in the survey, 76% were found to be male, and 24% female, as shown in Figure 4. Notably, for the sectors of aviation and defense, no female respondents were interviewed. For the sectors of agriculture, construction, disaster management, and resource management, there were more male than female respondents. For the sector of health there were more female than male respondents.
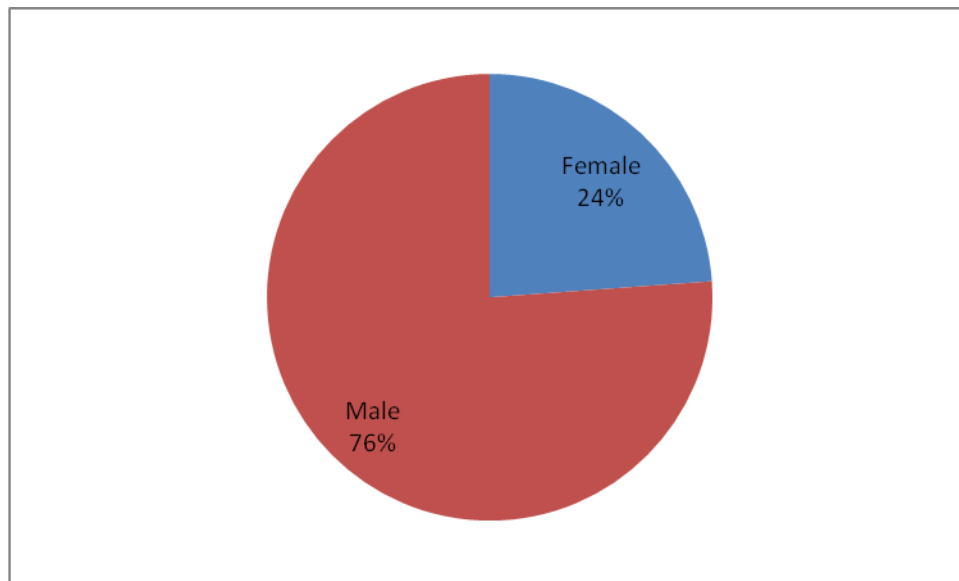
Figure 4: Respondents Gender

2.2   Channels of Delivery

This section aimed at investigating how respondents get access to weather information. It was found that 67% of the respondents receive weather forecast information, 30% do not and 3% are oblivious of the existence of such information. Figure 5 shows the comparison of the different channels through which respondents receive weather information. As shown, most respondents claimed to receive the weather forecast information at the end of the presentation of a news bulletin on different TV stations, followed by radio. Some respondents received weather forecast information through newspapers, and even others through various applications on mobile telephones.
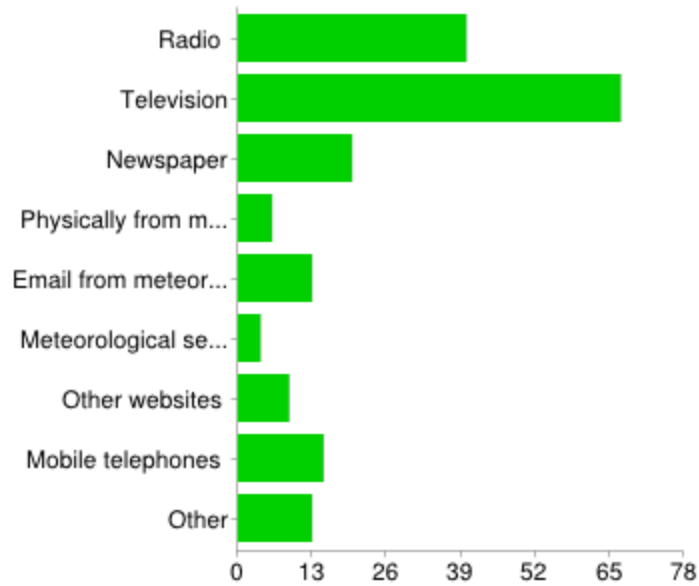
Figure 5: Ways of Access

The respondents that chose the option of others indicated that they receive weather forecast information by their experience on the knowledge of weather from past seasons, natural signs such as cloud gathering, direction of wind or dropping of leaves, or as had been informed by their forefathers, or from conversations with friends. Table 2 shows a summary of the popular / easiest ways of access for the different sectors.

Table 2: Ways of Access for Sectors

Sector	Popular ways of access (in decreasing order)
Agriculture	Radio, TV, email from meteorological service, experience
Aviation	Physically from meteorological service
Construction	TV, newspaper, radio, physically and email from meteorological service
Defense	TV, radio, newspaper, other websites
Disaster Management	Radio, Email from meteorological service, TV
Health	TV, mobile phones, radio
Resource Management	TV, newspaper, radio, mobile telephones

31% of the respondents found it very easy to understand the format and language used in the forecasts and severe weather warnings, while 40% found it easy, 20% neutral, 6% difficult and 3% very difficult as shown in Figure 6. The figure presents number of respondents.
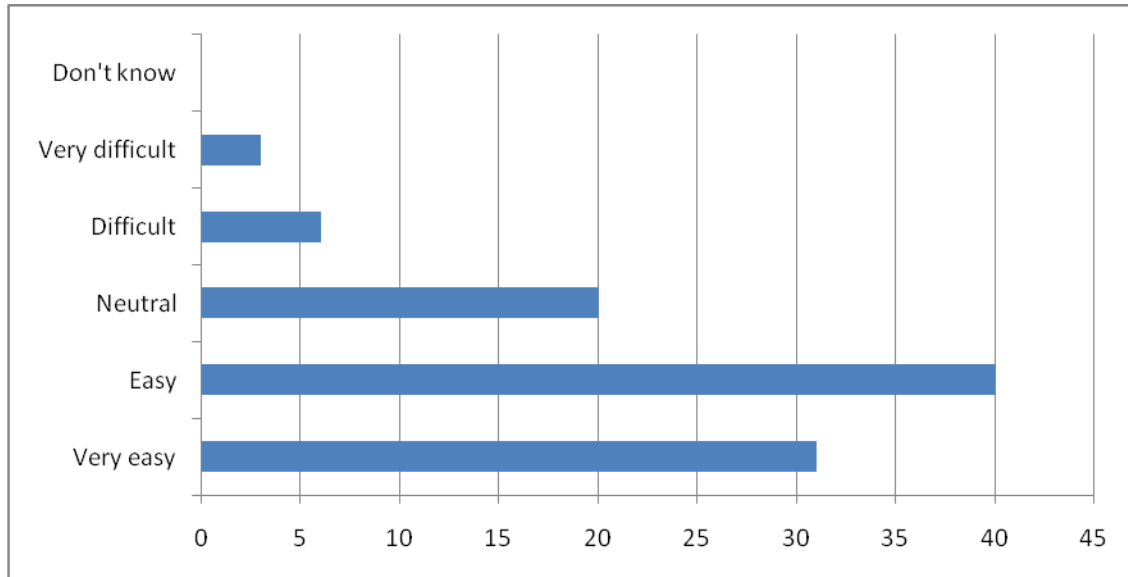
Figure 6: Understanding format and language of forecasts

Generally, even though most of the respondents found it easy to understand the format and language of the weather forecast information, a number of them chose the option of neutral, especially respondents from the sectors of agriculture, health, construction and resource management.

2.3 Usage and accessibility of information

In this section, we present results of usage and accessibility to weather information.

2.3.1 Impact and usage of weather information

86% of the respondents are affected by weather in their day-to-day activities. Weather information for these respondents affects their plans and decisions, all sector-related, such as when to plant crops, weed, or harvest, and when to execute projects in construction. It also affects transportation, patients visiting health facilities, travelling, fishing, and may lead to poor customer service delivery, hinder interventions for disaster preparedness, pastures for livestock, convenience of movement, grid power supply, to mention but a few.

Considering the specific sectors, respondents from construction were most affected, followed by those in resource management, agriculture, disaster management, with an equal number from defense and health.

31% of those who receive the forecast use it daily, 10% use it twice a week, and 13% once a month, 46% rarely use the weather forecast information, as shown in Figure 7. Even though most of the respondents rarely use the weather information they receive, it was noted that some of the respondents did not provide a response to the question. Respondents from the sectors of aviation, resource management and construction use the information on a daily basis.

On the other hand, 10% of the respondents think that they are not affected by the weather forecast information. These respondents are generally spread across the sectors, with the health sector having the most.

4% of the respondents did not provide a response to the question.
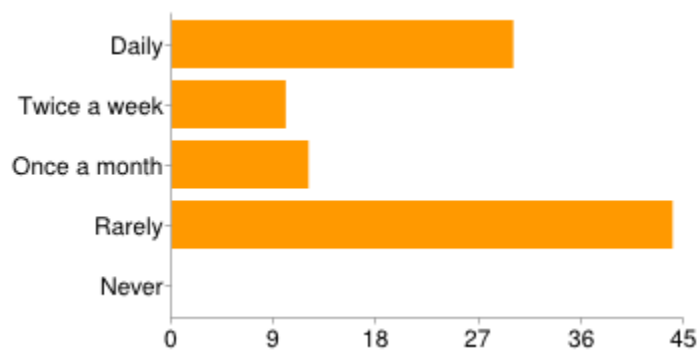
Figure 7: Frequency of use of weather forecast

Figure 8 shows the respondents' interest in weather forecast information. Most interest was expressed by the respondents from the sector of agriculture, followed by those in resource management, disaster management, and construction. Most respondents from the sector of health were somewhat interested in weather information.

47% of the respondents are very interested in receiving the weather forecast information which is useful for them in different ways.

Those from the field of Agriculture are interested in accessing information regarding the onset of the wet/rainy season, the duration of the dry season, planning for flood control, lake/river quality monitoring, deciding when to plant, harvest, irrigate, thin crops, prediction of water levels for animal keepers and spray animals. For agricultural research, information on temperature variations helps to project certain crop yields.

For the sector of Aviation, this information is useful for scheduling of air flights and for travel, while for the Resource Management sector, the information for the energy sub-sector is used to plan for movement of IT equipment, installation of devices outside buildings, dismantling equipment to avoid exposure to bad weather, while for the water sub-sector, monitoring flood gates that provide water to dams and predicting electric power generation capabilities.

For the construction sector, weather information is used schedule outdoor activities on project sites, and estimate when to plan for construction jobs, where to schedule fieldwork activities and corresponding field work gear while for Disaster Management, weather information is shared with communities to help in designing activities that can mitigate the effects of the weather, particularly rain. If it is expected to rain heavily, communities where Disaster Risk Reduction programs are being implemented are supported to design flood control measures.
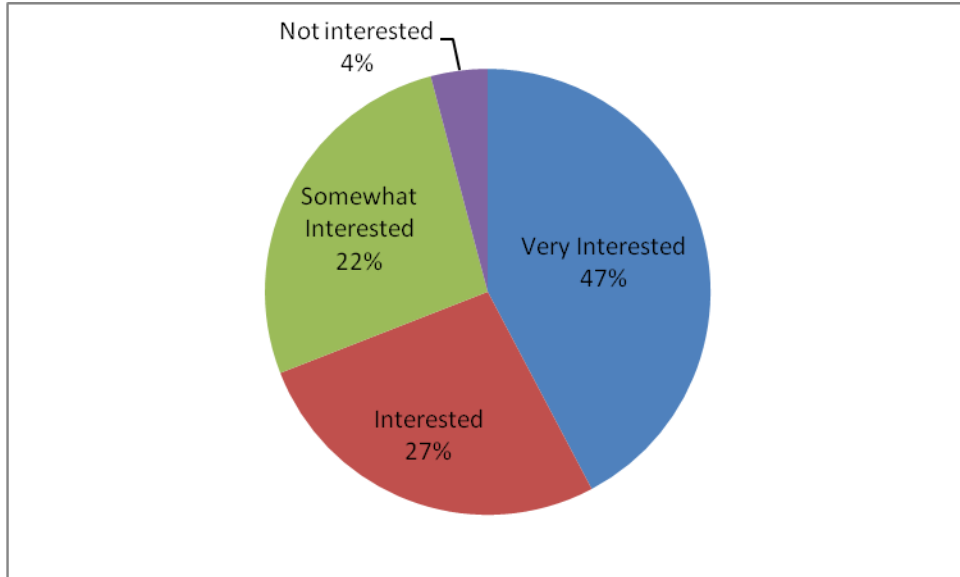
Figure 8: Interest in Weather Forecast

2.3.2 Usefulness of forecasts and severe weather warnings

Figure 9 is a visual representation showing how the respondents who participated in the survey rated the usefulness of the weather forecasts and warnings of severe weather received. Most (48%) of them found the information very useful as indicated. Respondents mainly from resource management, construction, agriculture and disaster management rated weather forecast messages and warnings of severe weather as very useful.
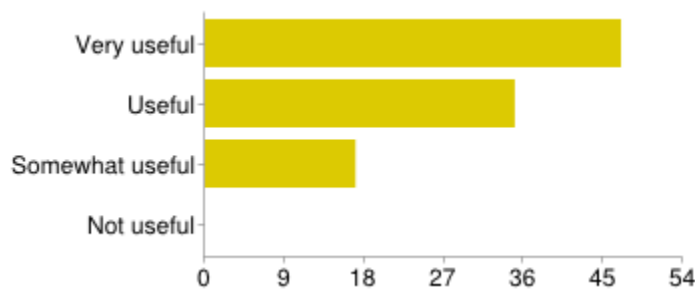
Figure 9: Usefulness of weather information

Also, the respondents found weather information useful for several reasons, hinged around the need to be able to plan their activities accordingly such as survey and road works (in hilly areas), bridge construction, preparing livestock keepers appropriately for bumper harvest of animal feeds, for the safety and amount of fish caught, prediction of disease causing agent trends, planning the stability of the electricity network to ensure safety of the community, staff and property and enable sending of radio warnings, providing proactive water quality management and enabling design/redesign of water utility facilities to withstand conditions such as drought/flood control, mitigations for emergency. However, the respondents that found the weather information somewhat useful (17%) pointed out that often times the information provided is irregular, inaccurate and unreliable. These respondents were mainly from the health sector. Some of these preferred to rely on the experience and knowledge of past seasons as passed on from their ancestors and observing the skies for changes so as to determine the upcoming seasons, especially for the sector of agriculture.

2.3.3 Aspects of weather information

For the aspects of weather information in regard to its accuracy, timeliness and access, figures 10, 11 and 12 show their comparison across all the sectors.
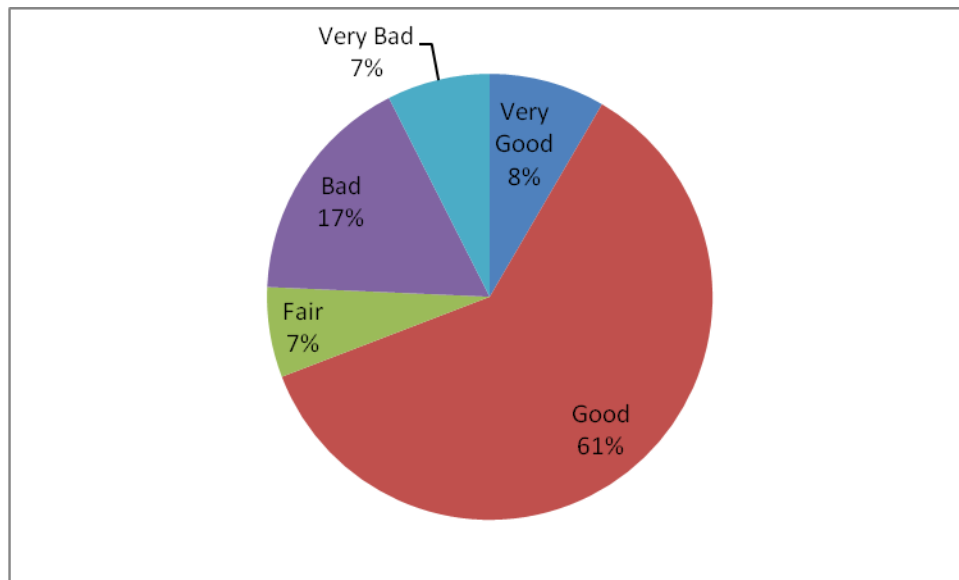
Figure 10: Accuracy of weather information

By ranking of sectors, respondents from construction, resource management, disaster management, agriculture, defense and health generally found accuracy of the weather information to be good. In terms of timeliness, respondents from resource management and construction generally found the information timely, and the same sector respondents ranked access of weather information as generally being good.
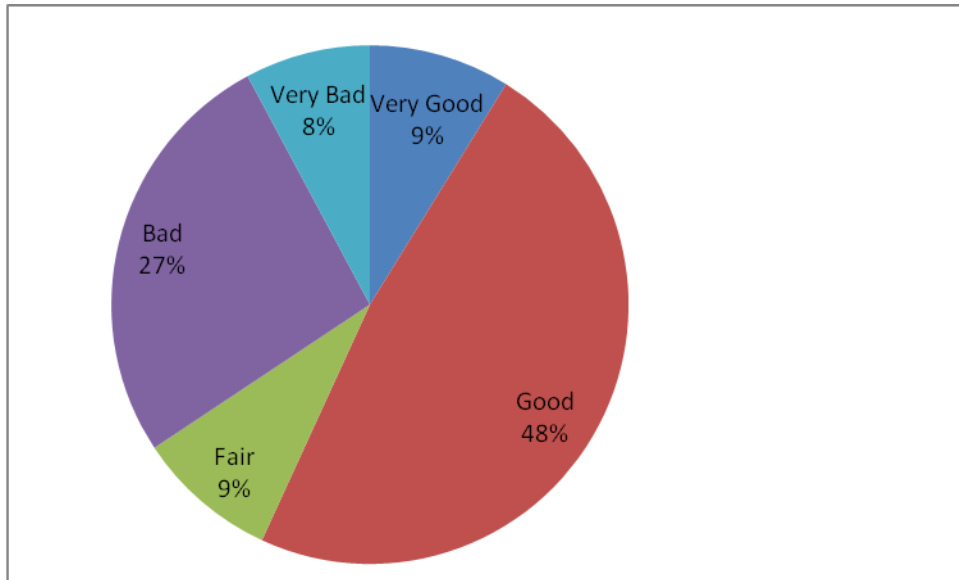
Figure 11: Timeliness of weather information
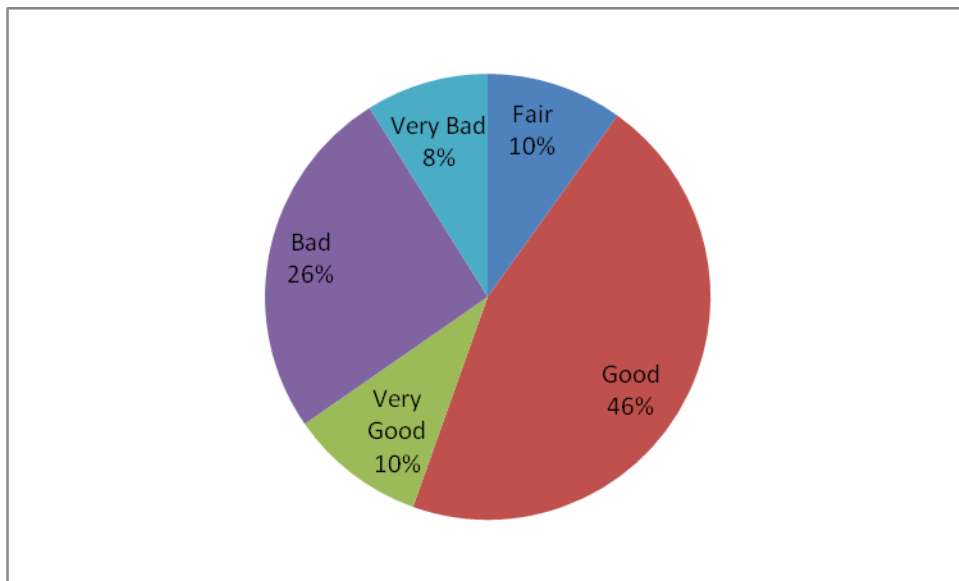
Figure 12: Access to weather information

It should be noted that about the same percentage of respondents found these aspects very good, and generally most of them thought the information is timely. However, respondents from the sectors of agriculture and health generally found these aspects of weather information to be fair and bad respectively.

2.3.4 Accessibility of weather information

Figure 13 shows the respondents who receive daily weather updates to be fewer (31%) than those who do not (69%). This occurred generally across all of the sectors, except for the sector of

construction where almost an equal number of respondents receive daily forecasts as those that do not. The respondents from the sector of aviation receive daily forecast information. The figure presents number of respondents.
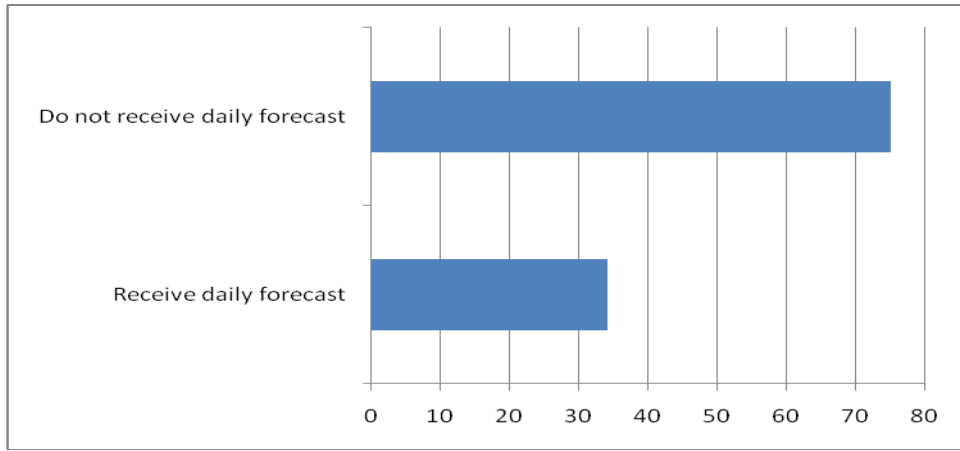
Figure 13: Respondents who receive daily weather updates

However, of the portion that does not receive the forecast information, most (43%) preferred receiving updates on a need to know basis (on demand), especially for the sectors of agriculture, resource management, and disaster management, 13% hourly, 10% after three hours, and 34% after six hours, as Figure 14 shows. The figure presents number of respondents.
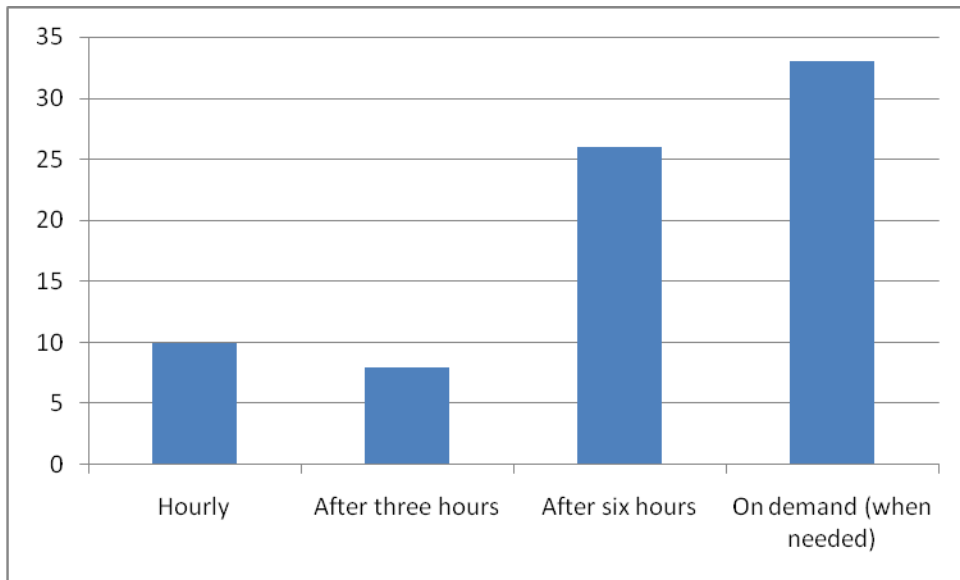
Figure 14: Frequency of daily Updates

For the respondents that receive daily weather updates, most of them received them once daily, on Television programs such as after news bulletins, and some on their smart phones all the time. Respondents from the sectors of agriculture, disaster management and health receive seasonal updates and prefer to receive these on a quarterly basis. It should however be noted that the respondents from the sector of agriculture receive both daily and seasonal updates. Fishermen particularly rely on daily weather information, while crop farmers rely on seasonal weather information.

On comparing the forecasts and warnings of severe weather provided today to two years ago, respondents stated that they are generally more useful and the information about forecasts themselves more available, in comparison to 5 years ago.

2.4   Packaging of Information

27% of the respondents were interested in weather forecast information for a day (say 3 hours ahead), and possibly all day. The respondents from the sectors of agriculture and health were interested in weather information for a season, while those from aviation for a day, three hourly. The respondents from the sector of disaster management were equally interested in weather information of a day, three days ahead, and a month. In terms of area, the respondents from the sectors were mostly interested in weather information for their regions, basing on the activities they undertake. They ranked the regions in terms of the country, region, district, village, county and parish.

2.4.1 Elements of interest in weather forecast

The survey also sought to establish which elements would be of interest to respondents from among rainfall, temperature, wind and cloud cover.

For the sector of agriculture, most (99%) of the respondents were very interested in knowing about the rainfall/hail, followed by wind, temperature, cloud cover and sunshine. For construction, 96% were most interested in the rainfall, followed by the temperature and wind, and finally sunshine. The respondents from aviation were most interested in wind, visibility, temperature and pressure. For Defense, the respondents were generally interested in wind, visibility, temperature, but not interested in cloud cover. The respondents from Disaster Management were very interested in information on rainfall and temperature, with interest tapering on wind and least on cloud cover. The Health respondents were slightly interested in rainfall, wind direction and temperature, while resource management respondents were most interested in rainfall, specifically its patterns that affects water flows and speed.

Generally the respondents interviewed also expressed interest in information on sunshine and humidity being part of weather information presented. Tables 3 and 4 show the elements of interest to the respondents in the different sectors.

Table 3: Elements of Interest in weather forecast

	Agriculture, Construction	Aviation	Disaster management	Health management
Rainfall/Hail	†		†	†
Wind	†	†		†
Temperature	†	†	†	†
Cloud Cover	†			
Sunshine	†			
Humidity	†			
Pressure		†		

Table 4: Elements of Interest for Stakeholders

	Construction	Defense	Resource management
Rainfall/Hail	†		†
Wind	†	†	
Temperature	†	†	
Cloud Cover			
Sunshine	†		
Humidity	†		

2.4.2 Weather Information Presentation

49% of the respondents preferred to receive a detailed, but not technical weather forecast with the following aspects:

i. Critical parameters highlighted, such as amount of rainfall received and expected, speed of wind and the direction, temperature of the day, among others

ii. Precise and short graphics, tabular formats used to present the weather information

iii. Sent on SMS or applications on phones

iv. Presented with captivating programs on TV, and well explained

v. Packaged based on the users, e.g., for researchers and users from aviation sector, provide detailed information, whereas a summary may suffice for those from the agriculture sector. Respondents also preferred packaging by region or district.

vi. Dedicated sections in the print media such as newspapers and magazines

vii. Be accompanied by advisories for the consumers to be able to take immediate or required action

The research team found that many respondents from all of the sectors did not answer the question, but those that did preferred a weather summary.

The language of presentation was chosen to be English for the literate, but local dialects for all other indigenous people. The researchers learned that the seasonal forecast is currently being translated into 12 local languages and disseminated to farmers. However, the impact of this translated forecast should be investigated in future surveys.

2.5   Issues and Recommendations of Respondents

Figure 15 shows that more respondents would advocate for assistance/training in the interpretation of the weather forecast. This was particularly for the sectors of disaster management, agriculture and health. More respondents in the sectors of aviation, construction, and resource management purported not to need as much training in the interpretation of the weather information.
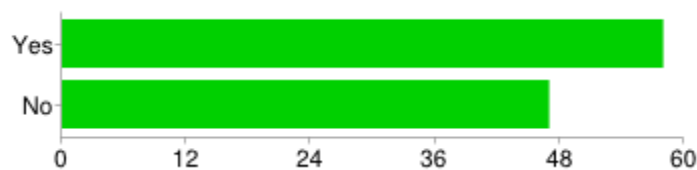
Figure 15: Training in Interpretation of weather forecast

2.5.1 Suggestions by respondents to enable effective weather information dissemination

Several suggestions/recommendations were provided by the respondents, and included:

i. Weather information be disseminated by integrating it into community meetings

ii. Disseminate the weather updates directly to people's phones on request as the majority of the people have mobile phones.

iii. Weather magazines specifying information of the previous month and projections in the new month to provide details of all weather parameters. This could be delivered on a monthly basis.

iv. Provide via Internet, by creating an online all-time access Management Information System (MIS) capturing all regions of the country and the world. The MIS should be available all the time.

v. Train people in the community who could help and update the community during community gatherings.

vi. Drama groups, radio talk shows, printed bulletins sent by email, website

vii. Simplifying terms used in the forecast presentations such as normal/below normal and others used in the dissemination

viii. Create a data bank that can easily be accessed and that is regularly updated

ix. Use social media other than the traditional TV, Radio, Newspapers, etc channels.

x. Information should be daily/ weekly, should be disseminated in the simplest form possible (local language simple to read and interpret) especially to the communities

xi. Regulate, furnish and staff defunct weather stations

2.5.2 Implications of the Survey and Conclusions

i) There is need to improve timeliness (by 40%) and accuracy (31%) of weather forecasts

ii) Presenting weather forecast in local languages will make it easy to understand

iii) There is need to constantly sensitize the public to embrace weather information so as to increase interest in the usage of the information

iv) There is need to build capacity of community leaders on how to access, interprete and communicate weather information.

v) Considering that over 50% of the stakeholders opted to be trained, the media also need to be trained on interpreting weather information, and its usefulness, so they are able to present it meaningfully

vi) There is need for the meteorologists to come down to the village level and training of village weather forecast information analysts.

vii) A platform to provide on demand weather information should be provided

3 Discussion, Challenges and Recommendations

This section presents a discussion on the findings of the survey that are presented in section 2.

3.1 Implication to UNMA

Results on accessibility and usage indicate a great interest (over 50%) in weather information. As part of their mandate, UNMA emphasizes an effective weather dissemination system in order to create impact. From the results 99% percent of the respondents in agriculture sector were most interested in the rainfall, it is therefore important to create more products that can serve their interests. Different sectors need varying detail of weather information with 49% requiring detailed forecast. Considering the experience and expertise within UNMA, the report highlights key directions and indicators for current and future emphasis.

To move towards addressing some of issues of accuracy, timeliness and accessibility highlighted by the respondents, UNMA needs a multi-faceted approach for weather information dissemination. UNMA needs to broaden its current approaches to support more automated and on-demand systems that are concomitant with the demographic trends of the Ugandan population.

3.2 Implication to WIMEA-ICT

The findings presented in section 2 of this report present some interesting statistics on weather information, how it impacts consumers and how they respond to it.

For instance, Figure 2 showing the age of respondents shows that the age brackets from 26-36 and above possibly have more access to weather information, even though the percentage gradually reduces as the age increases. The 18-25 possibly are not as exposed to weather information as the other age brackets. There is therefore a need to target the interest of the youth to participate in consuming weather information.

Figure 4 shows that most respondents interviewed were men, possibly because women are not as proactive as their male counterparts in watching the news, or listening to radio or reading newspapers. Some of the female respondents claimed that they do not have much control over

what is listened to on the radio or watched on TV. There is therefore a need to find ways in which weather information can be indiscriminately disseminated.

Figure 5 illustrates that even with technological advances of radio, TV, mobile telephones, some respondents still rely on traditional or indigenous ways of accessing weather information, by basing on knowledge of past seasons and word of the forefathers. It may be important to present dissemination strategies that incorporate both modern and traditional means of access.

In subsection 2.3.1, 10% of the respondents interviewed thought they are not affected by weather forecast information. It is imperative that WIMEA-ICT provides reason for this category of people to find interest in weather information and make use of it for their life activities.

Also, considering Figure 8 that shows the percentages of respondents' interest in the weather forecast, it can be noted that 47% were very interested in this information. With a system in place that makes it easier to access and present weather information, a larger percentage of weather information users and consumers can be obtained and retained.

Whereas most respondents receive weather information through the news bulletins on television, this does not necessarily mean that they have sought the information, as it is presented to them as part of the program they are watching or listening to. They have no control over the information received. The WIMEA-ICT project therefore seeks to achieve intentional weather information dissemination to the different stakeholders and change the status of Figure 7 that showed that even though respondents receive weather information, they rarely use the information.

Generally, diversity in detail, urgency, accuracy and accessibility in the need for weather information by different stakeholders highlights a need for a robust, efficient and dynamic weather information dissemination system. The desired system must be accessible, anytime, anywhere. The possible system is an online, mobile platform for weather dissemination. The platform requires voice, textual, graphical and analytical weather information. The WIMEA-ICT project as a future work will design a comprehensive, automated weather information dissemination system in collaboration with UNMA to enhance the impact created by weather information in the different sectors. The information can also be used to create advisories for the different sectors.

3.3 Recommendations

All media houses such as televisions, radio, newspapers and magazines should dedicate some space to all aspects of weather forecasts and related advisories. This will also provide sensitization to the public on weather information.

UNMA should engage institutions such as academia and telecom companies to develop a system to cater for weather information dissemination through mobile weather updates so as to improve the timeliness and access to weather information. This system should incorporate use of

emerging trends such as social media which should serve as a motivator for more youthful weather information users, and this should be done by December 2016.

UNMA in collaboration with the Ministry of Gender should establish ways to engender weather information messages so as to equally target all users with weather information.

Appendices

Appendix A: The Research Team

Name	Department
Doreen Tuheirwe-Mukasa	COCIS
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Prof. Charles P. K. Basalirwa	Met Unit, CAES
Alex Nimusiima	Met Unit, CAES
Dr. Richard Okou	CEDAT
Dr. Benjamin Kanagwa	COCIS
Ruth Mbabazi	COCIS

Appendix B: Survey Questionnaire

SURVEY ON THE STATUS OF WEATHER INFORMATION DISSEMINATION SYSTEM IN UGANDA

Preamble

We are conducting research into what information people would like to know about the weather. This survey is part of project named WIMEA-ICT that brings together researchers from Makerere University, University of Bergen and Uganda National Meteorology Authority with aim of improving weather information using ICT.

Please answer the following questions. Responses you give are restricted for this purpose and will be confidential. The purpose of the survey is to:

1. Generate and report on the current usage of weather information

2. Inform the WIMEA-ICT project on the current and future weather information needs in different sectors and users

3. Inform and guide appropriate modes and packaging weather information for different purposes.

Thank you.

General Information

1. Title/Position/Occupation---
2. District of Respondent--

3. Sector/Major economic activity of respondent--

4. Age: (tick appropriate):

   (a) 15-25
   (b) 26-36
   (c) 37-47
   (d) 48 and above

5. Sex (tick appropriate) :

   (a) Male
   (b) Female

6. Highest Education level (tick appropriate):

   (a) None

(b) Primary level

(c) Secondary

(d) Tertiary

1

Channels of delivery

7. Do you normally receive weather forecasts? (tick appropriate)

   (a) Yes

   (b) No

   (c) Not aware

8. How do you usually get your weather information? (tick all that apply)

   (a) Radio

   (b) Television

   (c) Newspaper

   (d) Directly from meteorological

       service i. Physically

       ii. Through email

   (e) Meteorological service website

   (f) Other websites

   (g) Mobile telephones

   (h) Other sources (please specify)--

   ----

9. How easy is it for you to understand the format and the language used in the forecasts and severe weather warnings? (tick appropriate)

   (a) Very easy

   (b) Easy

   (c) Neutral

   (d) Difficult

   (e) Very difficult

   (f) Don't know / no comment(s)

Usage and accessibility of Information

10. (a) Does the weather affect your day-to-day activities?

    i.
    Yes
    ii.
    No

    (b) If YES, how?---

    ----

11. How often do you use weather forecasts? (tick appropriate)

(a) Daily

(b) Twice a week

(c) Once a month

(d) Rarely

(e) Never

12. How interested are you in weather forecasts? (tick appropriate)

   (a) Very interested

   (b) Interested

   (c) Somewhat interested

   (d) Not interested

13. Mention examples of uses (activities, decisions) of weather information----------
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   ----

14. (a) How useful do you consider the forecasts and warnings of severe weather you receive? (tick appropriate)

   i.   Very useful

   ii. Useful

   iii.   Somewhat useful

   iv. Not useful

   (b) Explain why--

   ----

15. Comment on the following issues regarding weather information

	Very Good	Good	Bad	Very Bad
Accuracy				
Timeliness				
Access				

16. (a) Do you often receive daily weather updates?

   i. Yes

   ii. No

   (b) If No, how often would you like to receive the updates? (tick appropriate)

   i. Hourly

   ii. After three

hours

iii. After six
hours

iv. On demand (when needed)

(c) If yes, how often do you receive the weather updates?------------------------------

----

17. (a) Do you often receive seasonal weather updates?

    i.
    Yes
    ii.
    No

  (b) If No, how often would you like to receive the updates?

    i. After   10
    days   ii.
    Monthly
    iii. Quarterly

  (c) If yes, how often do you receive the weather updates?------------------------------
----

18. Compared to 2 years ago, forecasts and warnings of severe weather are … (tick appropriate)

  (a) More useful

  (b) About the same

  (c) Less useful

  (d) Don't know / no comment(s)

19. How do you rate availability of weather forecasts compared to 5 years ago? (tick appropriate)

  (a) More available

  (b) About the same

  (c) Less available

  (d) Don't know / no comment(s)

Packaging of Information

20. Are you most interested in the weather forecast for.. (tick appropriate)

  (a) Today (say 3hours ahead)

  (b) Three days ahead

  (c) A week ahead

  (d) A month

  (e) Seasonal

  (f) Others (specify)---
----

21. Are you interested in weather for a particular part of the day (tick appropriate)

(a) All day

4

(b) Morning

(c) Afternoon

(d) Evening

(e) Night

(f) On demand

22. Are you interested in weather for ... (tick appropriate)

(a) Country

(b) Region

(c) District

(d) County

(e) Parish

(f) Village

23. (a) Are you interested in weather for a particular area?

   i.

   Yes

   ii.

   No

(b) If Yes, specify the area ---

----

24. Which elements would be of most interest to you in weather forecast? (tick where applicable)

	Very	Intereste	Somewhat	No
Rainfall				
Temperatu				
Wind				
Cloud				

Others (specify) --

----

25. Do you prefer:

(a) a weather summary

(b) a detailed weather forecast

26. How would you like the weather forecast information to be packaged? --------------

----

----

27. In which language would you prefer to receive the forecast? -------------------------

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Recommendations

28. Do you need assistance/training in the interpretation of the weather forecast? (tick appropriate)

  (a) Yes

  (b) No

29. Kindly give suggestions to enable effective weather information dissemination --
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THANK YOU VERY MUCH FOR YOUR TIME

Appendix C: Stakeholder Participants

No.	Name of Participant	Institution
1.	Mr. James Magezi Akiiki	UNMA
2.	Mr. Khalid Muwembe	UNMA
3.	Mr. Johnson Munaba	Ministry of Defense
4.	Ms. Stella Mbabazi	Ministry of Agriculture
5.	Mr. Waliwulya Martins	Waika Partners
6.	Mr. Apollo K Kaggwa	Waika Partners
7.	Lt. Mr. Mwayi	Air Force
8.	Mr. Choice Agaba	NARO-Kawanda
9.	Ms. Winne Nkalubo	NARO-Jinja
10.	Mr. Otto Alex Owori	Doctor, Mengo Hospital
11.	Ms. Rehema Nakawombe	UBC TV
12.	Ms. Olive Jaremwa	UBC TV
13.	Mr. Patrick Luganda	Farmers Media