

# WIMEA LAUNCHES WEATHER APP FOR FARMERS



**DIAL \*255\*85#**

# WIDS APP READY FOR UGANDANS

The knowledge and information through appropriate technologies (WIDS) will be wide-reaching with information and advice for farmers



Participants at the launch of WIDS at Esella Country Hotel in Kampala

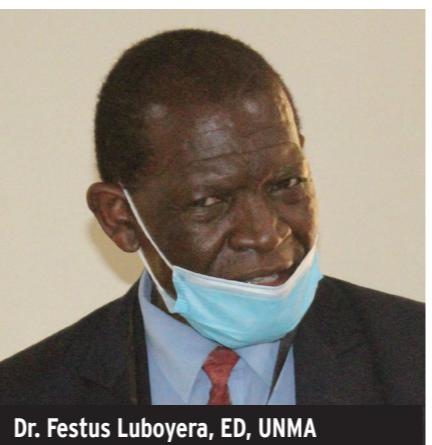
**E**ven though agriculture is the backbone of Uganda's economy, many farmers today have challenges that hinder their ability to be productive in this sector. Some of these challenges include disease outbreaks, the effects of drought on yields as well as finding advice on product pricing and local markets. Aisha Lwanga has grown eggplants and tomatoes in Kiwenda, Wakiso district for the past six years. However, one of her main challenges is predicting the weather vis a vis the planting seasons.

"Initially, knowing the weather forecast and getting good planting materials, especially for

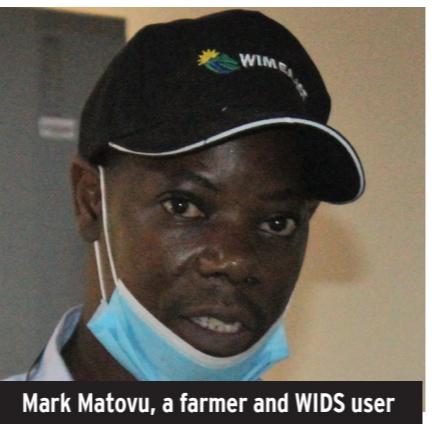
tomatoes was difficult," she said. She further pointed out that in the past, it was annoying to listen to the radio to get weather predictions today and be told to expect sunshine, only for it to rain in the evening.

However, currently, technology can address some of these challenges by helping farmers access crucial weather information which can improve their agricultural products. To help such farmers overcome some of these challenges,

The WIMEA-ICT project, launched the Weather Information Dissemination System (WIDS), which is a method of using the mobile telephone technology to help farmers monitor weather changes so as to know when to



Dr. Festus Luboyerwa, ED, UNMA



Mark Matovu, a farmer and WIDS user

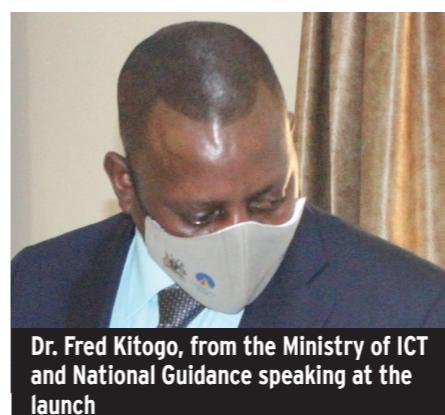
plant, weed and harvest.

While launching the App at Esella Hotel in Najjera, a Kampala suburb recently, Mary Nsabagwa, a PhD student on the project on the RC3 component said the application will enable farmers to access weather information by dialing \*255\*85# to access the message report and the WIDS service bundle will bring weather information. According to Nsabagwa, any type of phone can help a farmer to access this weather information at affordable charges. She said the technology, which is already being used, has helped farmers to be efficient and productive. Farmers using the App will get weather information in real time. The message can be accessed in English, Luganda, Lusoga, Rutoro, Runyankole and other languages. The App will support millions of farmers to assess

**The application will enable farmers to access weather information by dialing \*255\*85# to access the message report and the WIDS service bundle will bring weather information.**



Jane Nakiranda WIDS user - World Vision



Dr. Fred Kitogo, from the Ministry of ICT and National Guidance speaking at the launch

technology to access information can help control some of the challenges," she said.

Dr Julianne Sansa Otim, the WIMEA-ICT project PI said accessibility to reliable weather information makes farming planning easy. She said the App seeks to enhance quality production and use of technology to improve yields.

WIDS is working to develop and market a bundle of agricultural information products through SMS and phone use to enable Ugandan farmers to access quick information. Festus Luboyerwa, the executive director of Uganda National Meteorological Authority (UNMA), said, "Many farmers suffer losses, owing to limited information flow." He appreciated the WIDS saying farming is a professional and profitable business worth investing in.

## FARMERS SKEPTICAL

However, to some farmers, such practices appear to be time-consuming. One of the farmers facing this dilemma is Timothy Kibuuka, in Gayaza, who says he has never heard of that technology and he is not tech savvy. Commenting on the innovation, Kibuuka, said the technology should be first piloted with farmers away from the city centres because most challenges are experienced on the farms, away from Kampala.

Twaha Kakooza, a farmer in Bubajje village, Kayunga district says farmers must change their farming methods. "As farmers, we have the traditional farming knowledge that was passed down to us over many generations. However, we



Ass. Prof. Basalirwa CPK with Dr. Julianne Sansa-Otim at the launch of the WIDS Esella Hotel in Kampala

now need to embrace new technology so as to connect in a way that is convenient and cost-effective. Therefore, if this programme (WIDS) has come out with this idea we shall embrace it." He added that if farmers have ample knowledge, they can create awareness through learning, linking businesses and carrying out awareness campaigns.

#### INVEST IN AGRICULTURE

Dr Kidda Makubuya, the district production officer in Luwero pointed out that since majority of Ugandans are engaged in agriculture, the Government should place special emphasis on the sector, before thinking about other projects. "There is no country that has developed without



Dr Roselyne Akol

putting special emphasis on the main day-to-day activity of the population. We tend to take farming for granted. Some people even think that one should settle down to farming after they have failed at everything else or when they retire," Makubuya said.

Dr Fredrick Kitoogo, who represented the Minister of Information and Communications Technology and National Guidance said the government of Uganda identified the use of information and communications technology as a key strategy for spurring economic growth, improving the livelihood of citizens, efficiency and effectiveness of public service delivery. The ICT and national guidance ministry has prioritised innovation and promotion of local content as one of the key areas of focus. As one of the ways of promoting ICT innovation, the government of Uganda has designed the National ICT Innovation Support Programme (NIISP) to facilitate the creation of an ICT innovation ecosystem and marketplace for Ugandan innovative digital products.

He said the government realises the need to establish

a legal policy and a conducive regulatory environment, as well as establishing institutional frameworks to help drive the ICT revolution. "WIDS is clearly in alignment with the government of Uganda aspirations to use ICTs in economic development. WIDS is one such solution that mitigates the challenges imposed by the changing climate and in timely and accurate dissemination of weather information and demonstrates the usage of ICTs in economic development," he said. He emphasised that the mobile application will help farmers decide when and how to plant crops, select the best crops for a given location using climate and weather data and connect to the available market.



Prof. Tonny Oyana, Principal, College of Computing and Information Sciences

# MARY NSABAGWA

## My PHD was worth the fight

Mary Nsabagwa, 38, was born in Jinja and grew up in Maganjo, Wakiso district. She is a third child in a family of eight children, born to Mr. Rodderick Joseph Nanjubu and Mrs. Betty Nanjubu. She recently graduated with a PhD in Computer Science, specialising in designing wireless sensor networks for data transfer for automatic weather stations, which were sponsored by the WIMEA-ICT project. Below, she shares her tremendous journey.

**Q**

How has your journey been?

**A**

I have had a fair journey, thanks to my family and friends who have always been there for me. My dad always paid my tuition in time and I was never sent home for fees despite his low earnings

**How easy or hard was it for you to scale up the ranks to reach where you are?**

When you are surrounded by those who love, believe and care for you, and with God, all things are possible.

**How did your career path start?**

I got my first job while I was a student at Makerere University in my second year, earning sh40,000 a month. I was teaching biology and physics in Mwera Secondary School, on Hoima road. I was inspired by girls and boys who walked over 10 miles to and from school. Having been a village school, which had no lab, I was forced to use a few mirrors and needle to conduct a physics practical lesson on refraction. Miraculously, the same practical came two weeks in the physics UCE exams. I was so proud with myself since I was able to motivate my students despite their challenges.

Later, after my first degree in computer science, I got a job, working as a junior programmer on an e-learning project, attached to Makerere University, Directorate of ICT Makerere



Nsabagwa attends the WIDS launch: She recently graduated with a PhD in Computer Science, sponsored by WIMEA-ICT

University, led by a South African professor, at the University of Western Cape, with several collaborating Universities around Africa. This came after approximately six months without a job. Having had no connections at all, I did not have the opportunity of being placed on any job by any relative. While I felt my strength was in computer programming, I had no computer for practice.

With God all is possible. My friend, whose name I have forgotten, who was teaching in Gulu lent me his very old laptop, just after school, to help me. However, due to financial challenges, he picked and sold the laptop a few months later, just before I was interviewed for the Makerere job. Having done some practice, the confidence I had gained got me the job, beating three of the bright boys on the interview panel. I became second and was



**Capacity building: Mary Nsabagwa training meteorologists from UNMA during one of WIMEA-ICT training workshops**

hired. It was an amazing feeling knowing that I would earn \$500. At that time, my retired father was struggling to raise tuition for my sister at the university from a small retail shop, this became a God-given opportunity. All the salary I got the first month went to my sister's tuition, enabling her to sit for her exams. Here, I managed to develop software, meet several people and secure myself a part-time job with Kampala University Ggaba in order to supplement my income, which was no longer enough. I can now see that in life, it is okay to struggle to get better and better.

At the expiry of the to year-contract with Makerere University, I had to do small projects in order to sustain my expenses and especially rent. I am glad I never defaulted for even a month. Later in 2017, after attending an interview for a masters scholarship by the Chinese government at the ministry of education, I went to China in 2007 for my masters in computer science. On returning from China in 2010, I was recommended to my job at the college of Computing, Makerere University as an assistant lecturer by my mentors Prof. Josephine Nabukenya and Dr. Jude Lubega. I am glad the recommendation was because of the excellent programming works they had seen me do in the past.

#### **How do you manage to balance the different roles in your life to achieve this academic success?**

The biggest part of my life after school has been in work. This is because I have been running

several projects at a time. I, however, dedicated most of this time to Makerere University. Having built a network over time, I execute almost all my projects with the help of my students at Makerere University. This team of young people has not only supported me in the technical assignments, but have taught me to appreciate people at work, respect them, reward them when necessary and treasure them all the way.

Appreciating people helps me to maintain this network and to finish what I do in time. In the last seven years, I have worked with other companies including Preg-Tech communications to gather requirements for Malago specialised hospital, MECC services to manage civil construction projects and my farm in Luwero, which is my passion. For the love of eating fresh mangoes. These occupy my time for the entire year.

#### **What challenges do you experience along the way and what strategies have you developed to address the challenges?**

It's never always easy. Since I mostly work with students, at the end of the year, they leave after acquiring the skills, leaving me with those without. Even those who are supposed to be with me leave when they need more. I strive to improve my student coaching abilities, enabling them to build new ones before they leave. While some of my students get other opportunities, they sometimes stay around since after evaluating the benefits such as ability to meet people, publishing

their work at an early age and having formed a family, they choose to stay despite the financial benefits.

#### **What has kept you going?**

Support from friends, family, my students coupled with my hard work

#### **Which/who is your source of inspiration in life?**

My inspiration stems from two people; my father, Mr. Joseph Roderrick Nanjubu, who with his low earnings was able to put the eight of us through school. He always says having not got a degree, all his children will get and he would get a PhD in the family. There is also Dr. Julianne Sansa-Otim, for believing in me the first time we met. I always work hard to show them that they were never wrong.

#### **What was your PHD about?**

My PhD is about building automatic weather stations to ensure that they can withstand the challenges that they are faced with during their operations. With this ability, the organ in charge of weather forecasting will have enough weather data to generate accurate weather forecasts. My research ensures that in case of failure, the automatic weather stations report the failure and recover such that operations are maintained. This is done without any human intervention.

#### **Apart from your PhD what do you do?**

I love farming and especially planting fruit trees.

#### **When your fellow PhD students on the WIMEA-ICT project finished before you, weren't you discouraged?**

Before me, Dr. Isaac and Dr. Maximus successfully defended their PhDs with high scores. These two inspired and encouraged me to complete mine.



**Sharing a light moment with Bjorn Pearson in Dar-es-Salaam**

I consulted those that finished before me. In fact, with the help of the structure of their thesis, I was able to finish mine with ease.

#### **Who were your most supportive supervisors?**

Dr. Julianne Sansa-Otime, Dr. Isaac Mugume and Dr. Roselin Akol

#### **What is your take on the girl child's uptake in the scientific world? Why are numbers still low and what can be done to increase enrolment?**

Despite the several interventions to elevate the girl child in sciences, the girls are still few. For instance, the Bachelor of Science in Software Engineering admissions admit less than 10% of female students every year. Many girls still lack the confidence to do science subjects and yet the few that have joined have made it with excellent results.

#### **What have been your achievements on the WIMEA-ICT project? Does the project have potential? Can it stand on its own without funding? How?**

WIMEA-ICT has built software and hardware infrastructure and networks. These are staying even after the end of the project in 2020. The



**Nsabagwa with Peter Kaamu, the project accountant during the AGM in Dar-es-Salaam in 2018**



**Training UoJ Masters students**

collaboration with the Uganda National Meteorological Authority (UNMA) from the very beginning made the WIMEA-ICT products their own. This means that WIMEA-ICT has already laid a foundation to sustain its innovations in the absence of the project funding. These products include a robust and affordable Automatic Weather Station, which is my main achievement on the project and for the country at large.

Other achievements of the project include a weather dissemination system accessible via a web portal ([wids.mak.ac.ug/wids](http://wids.mak.ac.ug/wids)) or by phone using \*255\*85# and the weather data repository for keeping weather data. These interventions require no licenses, making them affordable. The Government of Uganda, through the Ministry of ICT and National Guidance is also engaged to see how to sustain the products.

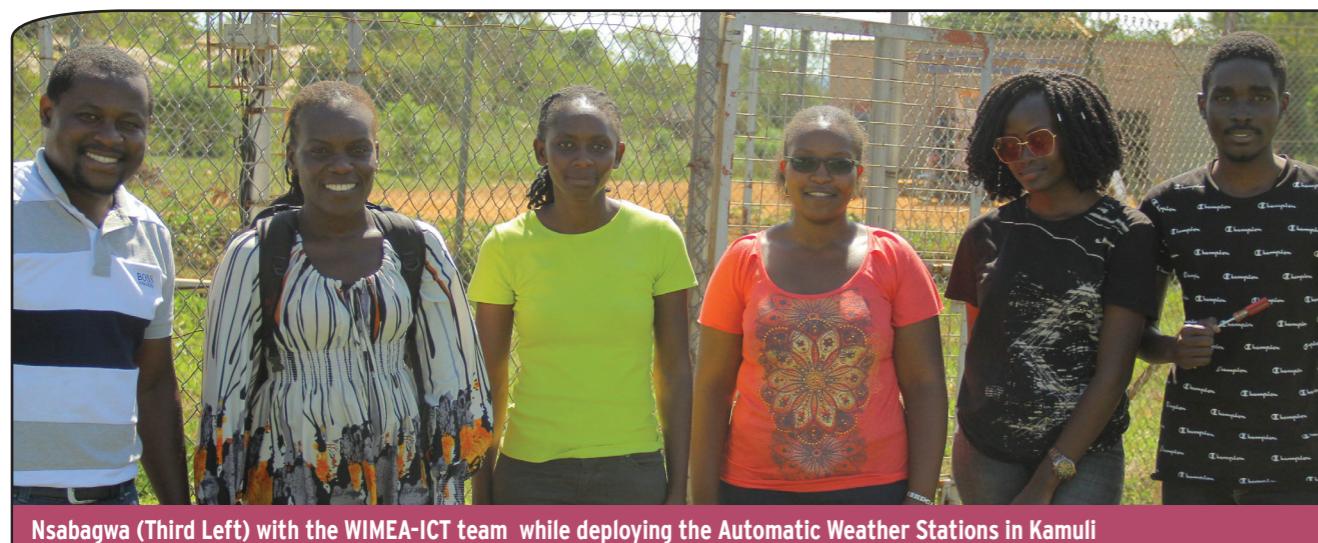
#### **How would you encourage women on how to be a star in life?**

Determination is key despite the challenges they are faced with. Women should try as much as possible not to be victims, to but strive to be victorious

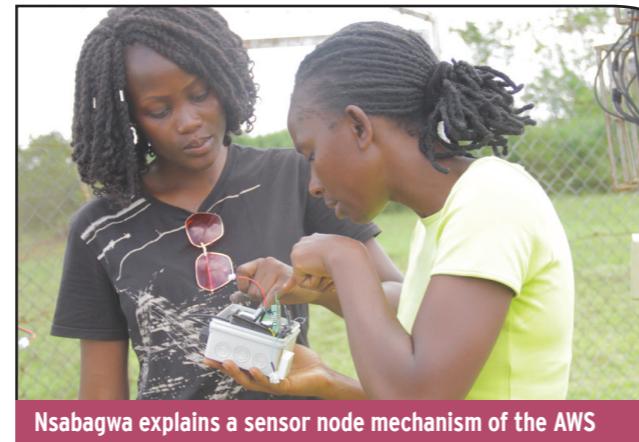
#### **What counsel do you give to ladies on how to bring out the star in them and reach for their horizon**

Young ladies should look up to the successful women before them. If they can, they too can. Girls should know that they can do what boys can do.

#### **How has the lockdown affected you? Have you been doing anything to help communities during these hard times? If so, then what is it and how have you**



Nsabagwa (Third Left) with the WIMEA-ICT team while deploying the Automatic Weather Stations in Kamuli



Nsabagwa explains a sensor node mechanism of the AWS

#### **been doing it?**

The lock down increased the need to deliver the weather information to communities as soon as possible. Many people have been resorting to agriculture to sustain their livelihood. Weather information is key in improving agricultural productivity. Therefore, for the past months, we as the WIMEA-ICT project team have been ensuring that the dissemination of weather information is efficient with the use of computers and mobile phones to help in planning.

We have used social media campaigns to inform communities, negotiated with the Ministry of ICT and National Guidance to intervene in order to lower the cost of getting the weather information and trained agriculturalists on how to integrate weather information into their farming activities. If one thing fails, be sure to try something else. All one needs is a decent income-generating activity. Don't be ashamed of what others will say if you are hawking food items by the roadside, as long as you are able to support yourself. Innovation is the way to go.

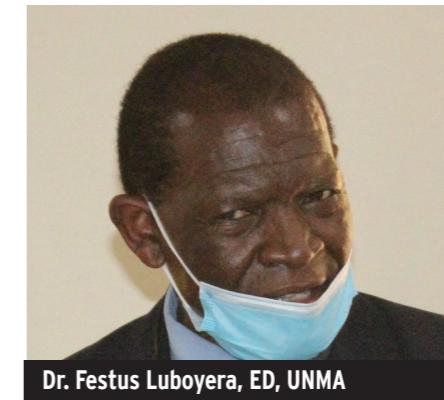


## AWS BENCHMARKING TAKES OFF



IMEA ICT has developed an Automatic Weather Station and deployed about 11 of them over a period of two years. Data was collected, and initial analysis made, where data from the WIMEA AWS was compared with that from the Makerere weather station provided by UNMA. The analysis was sufficient enough for us to conclude that the instrument is suitable for use in the industry. This brings us to the transition from research to operation, hence the need to engage people from water resources, academia and most importantly, the Uganda National Meteorological Authority.

The AWS is yet to reach a satisfactory level where it can be taken up. There still is more testing to be done to get it to the standard approved by the Meteorological Authority. This



Dr. Festus Luboyera, ED, UNMA

workshop was organised to give propositions which will be taken up. Its purpose is to strengthen the relationship between the academia and the Meteorological Authority. We as the academia are engaging our stakeholders to give some input for our product.

#### **OBJECTIVES**

1. To present the hardware and software of the WIMEA-ICT Automatic Weather Station to the stakeholders .

The AWS is yet to reach a satisfactory level where it can be taken up. There still is more testing to be done to get it to the standard approved by the Meteorological Authority. This

2. Develop a framework for testing the performance of the Automatic weather station.

WIMEA-ICT is represented by Uganda, Tanzania and South Sudan, and the initial plan was

to come up with a framework that presents the 3 countries.

Festus Luboyera, the UNMA ED said the day:

"Today memorable day, because we are looking back at our harmonious relationship with Makerere University, evidenced by the birthing of the AWS and the stakeholders gathered. WIMEA-ICT gave us introductory training in the Numerical Weather Prediction in 2015. We later had the Weather Data Repository, and noted that the data handling was problematic in the sense that the custom designed teams we had, like Clim Com and Clim Soft were lacking due to the different requirements and security issues. Our directorate of DADCS team worked hand in hand with WIMEA-ICT to develop an all-time, good weather data repository. With this, one can see which station is not reporting, get tailored weather reports and retrieve data with ease."

For full report, visit [www.....](http://www.....)

# The Internet of Things is here...

**W**IMEA-ICT Project hosted a workshop on LPWAN Solutions for the Internet of Things from 17th to 20th February 2020. The event was co-sponsored by Internet Society, Makerere University, UbuntuNet Alliance for Research & Education Networking, Research & Education Network for Uganda, Kenya Education Network, The Mozambique Research & Education Network, Tanzania Education & Research Network, and Network Startup Resource Center. It had participants from Uganda, Mozambique, Tanzania, Kenya, Rwanda and Italy. The Things Network (TTN) is a community project started in Netherlands, in 2015 with a mission to build a decentralized, open and crowd sourced internet of things data network OWNED and OPERATED by its USERS. With TTN, anyone is free to set up "Things" and connect to "Things Gateways" that may or may not be their own. Anyone is free to set up "Things Gateways" and connect to "Things Access" that may or may not be their own. Their "Things Gateways" give [free] access to all "Things" in a net neutral manner, limited by the maximum available capacity alone.

Everything that carries power will be connected to Internet eventually. Therefore, controlling the network that makes this possible means controlling the world. Therefore, The Things Network was founded to distribute this power to as many people as possible without the possibility of it being taken away by anyone.

## THE APPLICATION OF LPWAN IN UGANDA

### 1. Research in Universities

Three Universities were represented: Makerere University, Kabale University and Kampala International University. After the IOT training,

gateways were set up in different universities to aid students as they do research in the area of IOT. It was also meant to help in collaboration while doing various projects.

### 2. Monitoring Animal Health

Currently Sensors are being used to monitor health of animals by a company called Afrosoft IT solutions but it is depending on GSM network which is costly. Setting up LPWANs with gateways will help such companies to collect data over long distance.

### 3. Data collection using a concentrator and raspberry pie

The raspberry pie stores information and sends it to a concentrator, which forwards it to a server using GSM network

### 4. Mapping the location of animals

Take an example in areas where animals have been quarantined because of diseases, if each of these animals have a sensor embedded on them, it becomes quite easy to track the animals that might have been moved out of their location without permission.

### 5. ENVIRONMENTAL MONITORING

- Collecting and transmission of weather data using Automatic Weather Stations
- Monitoring condition of the Automatic weather stations for preventive maintenance
- Monitoring soil properties - PH, soil moisture, soil temperature etc.

### 6. SMART CITY PROJECT FOR EXAMINATION OF GREEN

infrastructure benefits within the Kampala metropolitan area. Assess Intra-city climatic differences and the vegetation development.

# STAKEHOLDER ENGAGEMENT

## We have enjoyed working with WIMEA-ICT - UNMA

We have had a positive experience engaging with the university. Like in all Meteorology services in Africa, we face technological problems, which always need home grown solutions. Looking at how UNMA has been developing, it is possible to procure technologies for your home country, only to find they are inadequate. We have about 36 automatic weather stations in the country. We needed to transmit data from those stations to Kampala in a routine time. However, we required a computer on site and yet the sites we were interested in had no power. A computer on site needed both power and a person to use it, which was impossible.

The coming of WIMEA-ICT was a big relief. The entire team comprising staff, teachers and students came together and having understood our problem, tabled a solution for us. We had to do away with all the computers on site, modems, power solar panels which were vulnerable to vandalism, which were replaced with a remote



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**WILSON WAISWA-UNMA**

metro unit. Now we are able to observe, store and transmit the data through our server. It is trendy for producers of automatic weather stations to want the data to first go to their servers, yet it is data from natural resources. Ideally, it

should first go to UNMA servers; and that is the condition we gave to the WIMEA team.

I consider that one of the biggest experiences, because it was out of that that we went to the level of signing a MoU with them. They were to produce a prototype, and the user would put in the funds. From there, we would ask them to design more prototypes to be installed in the field.

We also want to strengthen the dissemination to the point that each user must have a responsibility to initiate the search for information. This is because when it comes to general broadcast on the radio, it is hard to monitor who has checked it out and who is interested and has actually put it to use. By virtue of the fact that the farmer can use his phone and seek for the information gives us encouragement that the farmers are valuing the information. It is on that note that I can certainly say that we have positively benefited from the WIMEA-ICT project.



Mrs Rose Gitta, the leader of a women's farming group addressing the AGM



Doreen Mukasa trains women on how to use the SMS App

## Thank you for thinking about farmers - Mrs Gitta, a farmer

*In the past, we cultivated in the dry season, and we would lose all our produce. Then I was introduced to this project and weather forecasting. Because of the dissemination of the weather information, we now know how to prepare our gardens for the different seasons of the year; and this has contributed to my becoming a leading farmer. I raised a concern when Mrs. Doreen Tuhairwe-Mukasa came to hold the forecast group meeting, about many researchers who come to us carrying out surveys but never return with findings. However, I am glad to report that this has not been the case with WIMEA-ICT project. This is my second time to be here, and whenever we meet in such a setting, it is an opportunity to refresh my mind with what I've learnt in the past. I have encouraged and mobilised many other farmers to get on board and I request that the project is extended for our good.*



A farmer shares her testimony at the AGM in 2019



I stay near the shore of Lake Kyoga where 90% of the population are farmers. Buyende is currently undergoing electrification. I think the WIMEA-ICT project is going to be well received in my area. At first, they asked why we called ourselves weather forecasters and yet we do not have any machines. But as I speak, the people near Serere are accessing weather information using WIMEA-ICT stations.

## Farmers in Buyende district benefit from WIMEA-ICT

I particularly thank you for bringing weather awareness to my community. There is a watermelon farmer who has about 35 acres of watermelon, and he attributes his good yields partly to the fact that he doesn't have to merely guess what the weather will be like, but is intentional with his planting and harvesting because he has the weather forecast at his fingertips. I hope that the more the project grows, it can expand up to sub county level. I am ready to work hand in hand with the WIMEA-ICT team to see that they accomplish everything that the project set out to do.



Various stakeholders attending the AGM

# Engage government agencies for better sustainable results

Willington Amanyire, Senior Science Officer, Ministry of Science, Technology and Innovation

If you are going to work with the government, it is important that the system that you have is easier to incorporate in the existing system. Also, most of the monitoring activities are routine activities, which need constant check-up. I also notice that in some areas like Soroti Airstrip, you find 3 sets of the same system installed in the same place.

Sometimes we have too much to incur as the meteorology authority. When you install a system in a place, it is important that you give full authority to a local institution, like the local government or a school. This also gives them a sense of ownership. In a case where there is a technical problem, it is easier and quicker to get a technician from a nearby institution as opposed to waiting for one all the way from the capital.

Another good stakeholder to check out is the Ministry of Water and Environment, because they now have the Water Information System which was set up in 2018; WIMEA-ICT could check if their system fits in the National Water



*"Sometimes we have too much to incur as the meteorology authority. When you install a system in a place, it is important that you give full authority to a local institution, like the local government or a school."*

Information System. In the sustainability plan, I heard you mention something about telecommunication. I was wondering whether WIMEA-ICT is using a PI system. Sometimes, when there are network issues, data transmission also becomes an issue. There is a circular transmission system where you don't need to incur any cost. You just go to your instrument/station, and send data to the server at a free cost.

Otherwise, WIMEA-ICT is a good project for us as a country because it directly improves the major challenges facing our communities. We have a big challenge of weather dissemination, though at the same time, the available data can actually give us the information for us to take appropriate action. The fact that it is involved in the infrastructure, we can be sure to have sufficient data for us to know what is happening now, but also be able to predict the future. the fact that the information that is being collected provides a



Mary and Isaac demonstrating the prototype to the Chief Guest Flavia Munaaba State minister for environment



Celebrating the World Meteorology Day in 2016



platform into research and gives us the knowledge of what is around proves that it is one of those projects which are very good for Makerere University students, and the government at large.

The government is also constrained. Each sector requires funding, yet the government also has other priorities which are definitely important. In a scenario where it does not rain in Ntinda, but rains rather heavily in Makerere, we are left with one question. If you have a station at Makerere and it's the one you are using to forecast, your forecast will state that it rained in Kampala and the people will say you are telling lies. So the more we get funding to purchase more instruments, the better. We all know that the distribution of Rainfall in Uganda is influenced by so many factors. so this research therefore becomes very relevant, and more accurate forecasts mean more confidence in our meteorology department.

# RISKS AND MITIGATIONS



**1. Delay in approving of designed or revised curricular** – we continue to lobby and follow up with relevant agencies. We have broken through in this because all the previous curricular have been approved this year.

**2. Failure of the students to complete PhD and Masters programmes** – continuous evaluation through monthly progress meetings. Project extension has also helped, and the students still on the program all have a good chance of completing.

**3. Little research time among the researchers** – continue lobbying with the relevant authorities in our universities to be considerate of the research load

**4. Insufficient or limited number of interested staff to participate in the research activities** – it has not really been a problem to us, because whenever we invited people for these activities, they came.

**5. Low competence of staff participating in the research activities** – for this, we are leveraging capacity from partner institutions, and it is helping a lot.

**6. Uncooperativeness of the meteorology authorities** – this has been managed well by continuing to engage them and consult with and involve them at different stages.

**7. Low numbers from the Meteorology authorities to participate in the training authorities** – not a problem.

**8. Low cooperation from other stakeholders in the field** – has been managed similarly by continuing to engage and learning from each other.

**9. War in South Sudan** – the partners continued to support the work in South Sudan as much as possible to limit the risk

**10. Funds not being readily available in South Sudan** – was solved this year and they were able to access their funds

**11. Minimal or no gender equality in the project** – the gender focal person has helped on this, encouraging all partners to consider the numbers in all our activities.

**12. Low staff retention due to salary scales** – this is external, but we continue to encourage each other to source for research grants, for us to be meaningfully engaged in the research

without being discouraged

**13. AWSs being inaccessible due to low power** – was managed by designing a low power gateway that we continue to improve.

**14. Sustainability of products in general e.g. WDR, WIDS** – continuing to engage the public as much as possible so that they own these products.

The cost extension also allows for sustenance according to the demand.

If we continue to implement the strategies, the risks will be managed therein.

## Sustainability plan for the project

- How do we sustain outputs of products?
- How do we expand what has been produced?

**1. Engaging stakeholders** – The MoU has been signed between UNMA and WIMEA and there will be some financial support towards the project; TMA in Tanzania is already very interested in the weather dissemination systems and have co-financed part of the upgrade of the WIDS. They are to be continuously engaged so that they can own the product for sustainability purposes; For South Sudan, an engagement with the SS Meteorology department and the United Nations Mission in South Sudan; FAO is another partner of the UN that has activities running in all 3 partner countries, and has shown interest in the WIDS. We also continue engaging telecom companies because with the increase in number of weather stations, connectivity issues also increase.

**2. Soliciting additional funding** – IMAGINE seed project from the Global Challenges Research Fund in the UK, which has brought 2 more partners on board; there are also plans to apply for additional funding in NORHED 2, to be able to continue with what we started.

**3. Engaging the governments** – Government ministries must be engaged to utilise project products e.g. Ministry of Agriculture, OPM dealing with disaster and preparedness etc.

**4. Promotion of WIMEA products** – through various forums like farmers forums. Utilise the annual events to promote our products; social media to create awareness; impact assessment in each country, the output of which can be a report for us to disseminate through publications disseminated to other stakeholders.

# **WIMEA-ICT:**

## **Improving Weather Information Management in East Africa for effective service provision through the application of suitable ICTs**

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