

WIMEA-ICT

Improving Weather Information Management in East Africa for effective service provision through the application of Suitable ICTs - Newsletter **ISSUE 002- March 2015**

NEW DAWN FOR METEOROLOGY



Makerere to produce graduates with ICT skills

The Meteorology Unit at Makerere University in collaboration with the College of Computing and Information Sciences also at Makerere University, through the Weather Information Management for East Africa using suitable ICTs (WIMEA-ICT) Project, is set to introduce a new Masters programme called MSc. Applied Meteorology.

The Principal Investigator of the WIMEA-ICT Project Dr. Julianne Sansa- Otim, who is also the Chair of the Department of Networks, says in addition to developing the MSc. Applied Meteorology programme, two existing programmes namely: BSc. Meteorology and PGD Meteorology were also revised. The revision of these programmes was the key issue discussed during WIMEA-ICT's benchmarking workshop held in April 2014 at Esella Country Hotel, Kampala. The upgrade of

the course was agreed upon by stakeholders from the Uganda National Meteorology Authority (UNMA), National Agricultural Research Organisation (NARO), The National Meteorological Training School, the National Water Depository together with the Meteorology and Computing experts of Makerere University. According to Professor CPK Basalirwa of the Meteorology unit, the move aims to refine the Bachelor of Science in Meteorology curriculum and to create a new Masters programme, which will enable students to be relevant in the current times. For the Bachelors programme some of the revised course units include: Research Methods and Computer Applications in Meteorology, Agro-Meteorology, Hydro-Meteorology, Climate Change and Social Economic Implications as well as Communication Skills.

The PGD will run concurrently with the first year of the MSc. Applied Meteorology programme. In the developing of the new MSc. Applied Meteorology, related curricula from leading universities including the University of Bergen were benchmarked. The following relevant ICT course units have thus been included: Databases Information Storage and Retrieval, Weather Station Network Management, Decision Support Systems, and Mobile Software Development. According to Thomas Spengler, an Associate Professor at the University of Bergen, the new MSc. Applied Meteorology curriculum is complete, convincing and impressive when compared to similar curricula from other meteorological departments.

These new courses will produce meteorology graduates with computing knowledge relevant in our times.

UNMA's ICT journey progressive, thanks to WIMEA-ICT

James B. Magezi - Akiiki is the Ag, Assistant Commissioner, Training and Research (Climate Change Specialist) at the Uganda National Meteorology Authority (UNMA). He is also the contact person for IPCC Focal Point for Uganda. A veteran meteorologist with a Masters in Meteorology, he has worked on previous projects at Makerere University and is also involved with the WIMEA-ICT ongoing project. As a trainer, researcher and policy maker, WIMEA-ICT was privileged to have his input in the revision of the Meteorology curriculum at Makerere University. He talked to REBECCA RUGYENDO and DOREEN NERIMA about UNMA's ICT journey.

QUESTION: What has been the state of meteorology?

ANSWER: Before 1947, when the East African Community was still active, Uganda, Kenya and Tanzania worked together as the East Africa Meteorological Department. When the community collapsed so did the relationship in the departments die. This resulted in the formation of the Department of Meteorology (former DoM) which has now become the Uganda National Meteorology Authority (UNMA).

Q: To what extent are the weather forecasts from UNMA accurate and credible for public consumption?

A: The accuracy of our weather forecasts has improved over the years. However, the challenge is that the public doesn't know how to interpret the data we collect and disseminate. The data provided is usually 80% accurate so there is a possibility of a 20% failure. That the

public expects 100% total accuracy is expecting too much.

This is because of the poor network the unit currently has that limits the quality and accuracy of the data we collect. Staff training is going on in modelling better networks. Partnership with stakeholders is helping to improve and create awareness of weather information management and dissemination.

Q: Does UNMA have the sole and exclusive rights to weather data analysis, management and dissemination?

A: The Authority has developed an Act that states that for any information on local climate and weather to be accepted for public consumption, it has to be authorized by UNMA. This is intended to curb other sources that disseminate wrong weather information, especially on the Internet.



James B. Magezi - Akiiki

Q: How has ICT been embedded in the Meteorology unit?

A: Firstly, the introduction of Automatic Weather Stations has

been such a great leap. The unit currently has over 40 automatic weather stations. Although some have developed mechanical problems pending repairs or replacement, those that function well use GPRS thus sending data directly to the server at UNMA. These stations don't need personnel to read or manually record readings as it used to be in the near past. Visits to these stations are made for maintenance purposes.

Secondly, we are proud to introduce the UNMA Website. Through the website, links are being created with stakeholders so that they can conveniently send and receive data without personally coming to UNMA offices to get information.

Q: To what extent will this WIMEA-ICT partnership involve current technical staff working at UNMA?

Most of our staff are ICT literate and have taken the initiative to train themselves in relevant computer programmes.

Q: Are Meteorology students at the training school in Entebbe being oriented in ICT systems or are they still being tutored in the old manual system?

A: The training school has a computer laboratory, which means our students are computer literate. The institute originally operated under the Ministry of Education, Science and Technology, which meant that it was managed by the Government of Uganda. However, now that we have become an Authority, we are in the process of taking over, as other ministries like Health and Agriculture did when they became autonomous by recovering their training schools from the Ministry of Education.

Q: What's your take on the new Meteorology degree curriculum?

A: It is a good thing. In the past, there was no Meteorology Department at Makerere University so all those who wanted to study the subject had to go to Nairobi or Dar es Salaam. This made training to be a meteorologist quite expensive. This has resulted into a low manpower base.

The advent of this curriculum will help increase and improve our manpower. UNMA is in partnership with the WIMEA-ICT to carry out digitalization of data and also train technical staff.

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EDITORIAL WIMEA-ICT SCORES, SET TO GO HIGHER

The idea of improving weather information management in East Africa was born in 2008, following a disappointing farming season. I, like many Ugandans, had grown accustomed to the traditional rainfall patterns which were adhered to by our forefathers. During that season, I planned to grow maize since it was the "maize season". Unfortunately for me, nature took its toll and the rains delayed. What I had planted suffered lack of water and the harvest was terrible!

Having been previously exposed to accurate weather predictions during my stay in Europe, I began to wonder why such vital information was not readily available in Uganda. It was through this investigation that WIMEA-ICT was born.

WIMEA-ICT is a five-year project (2013-2018) funded by Norad under the NORHED programme. During the last one and a half years, several activities have been undertaken:

- Relevant curricula has been improved or developed at Makerere University, Dar-Es-Salaam Institute of Technology and at the University of Juba.
- Eight PhD candidates have been contracted for support from among the partnering institutions.
- National surveys on the Status of Available Weather Records have been undertaken in Uganda and Tanzania.
- National surveys on the Status of Weather Station Networks have been undertaken in Uganda, Tanzania and South Sudan.
- Also, a national survey on the status of Weather Information Dissemination has been done in Uganda. Join me in this issue, as we focus on the experiences and expectations of the curriculum development in Uganda, Tanzania and South Sudan.

Until next time, let us continue building the capacity of weather information management in East Africa using suitable ICTs.



Dr. Julianne Sansa-Otim
(PhD)
Project Principal Investigator

UNMA's future is bright and promising

(From page 2)



Primary school children visit the National Meteorology Centre to study about the weather and climate

Q: How best can the Authority increase awareness in schools and the public and interest people to join, making it more attractive?

We have embarked on a sensitization programme in schools; especially secondary schools, to encourage them to take part in this field. We are also producing booklets that are updated yearly to inform the public on what is going on. Weather information is important for our wellbeing. In these times of acute climate change, we are trying to ensure that the ordinary citizen is fully aware of their climate so that they can plan their social-economic activities accordingly.

Q: How will UNMA ensure it moves at the same pace with ICT standards globally in its daily operations, especially where weather information management

and dissemination is concerned?

A: It's the Authority's dream to move with this pace globally by embracing change as we move along.

Q: What are some of your major challenges?

A: Poor networks, under funding, under staffing and poor interpretation of weather information by the public. However, now that we are an Authority, things are looking up. The media has come on board. They come to us and ask about the meaning of weather data so that they can break it down to the people through their media houses.

We have also partnered with an organisation that has taken the current weather/climate information and has translated it in various languages for the consumption of the local farmers

in the villages who need it for farming purposes.

Q: As an Authority, what are some of your expectations and dreams this year?

Q: To reduce on the bureaucracy in the organisation so that we can make independent decisions as an Authority. For instance the ability to run our own budget will improve efficiency and ensure timely delivery of weather services and products.

Finally: I would like to appreciate Makerere University and the WIMEA-ICT project for such an enriching partnership. As an Authority, we look forward to the acquisition and set up of the Automatic Weather Stations the project will provide plus technical training and support they will accord UNMA staff in handling and managing these stations.

New Masters curriculum to benefit Tanzanians

Computational Science and Engineering (CSE) is a broad multidisciplinary scientific course that involves applications in science/engineering, applied mathematics, numerical analysis, and computer science. Computer models and computer simulations have become an important part of the research carrier, supplementing or replacing experimentation.

Going from application area to Computational results requires domain expertise, mathematical modeling, numerical analysis, algorithm development, software implementation, program execution, analysis, validation and visualization of results. The Computational Science and Engineering (CSE) involve all of these aspects. Computational Science and

Engineering (CSE) is the fast growing area which address solutions of various problems in science and engineering domain. Basing on this fact the Dar-es-Salaam Institute of Technology (DIT), funded by the WIMEA-ICT conducted a needs survey to find out the need of establishing a Masters Degree programme in Computational Science and Engineering at DIT.

The programme that is expected to commence in October 2015 is rich and practical.

In the situation analysis report (SAR), more than 95% of the consulted survey respondent stakeholders said this programme will provide quick and effective solutions to most socio-economic

challenges in Tanzania and elsewhere.

The report recommended the structure of the academic program, mode of delivery and the competencies, which include general attributes, supervisory, technical, research and communication skills as they are preferred by the stakeholders.

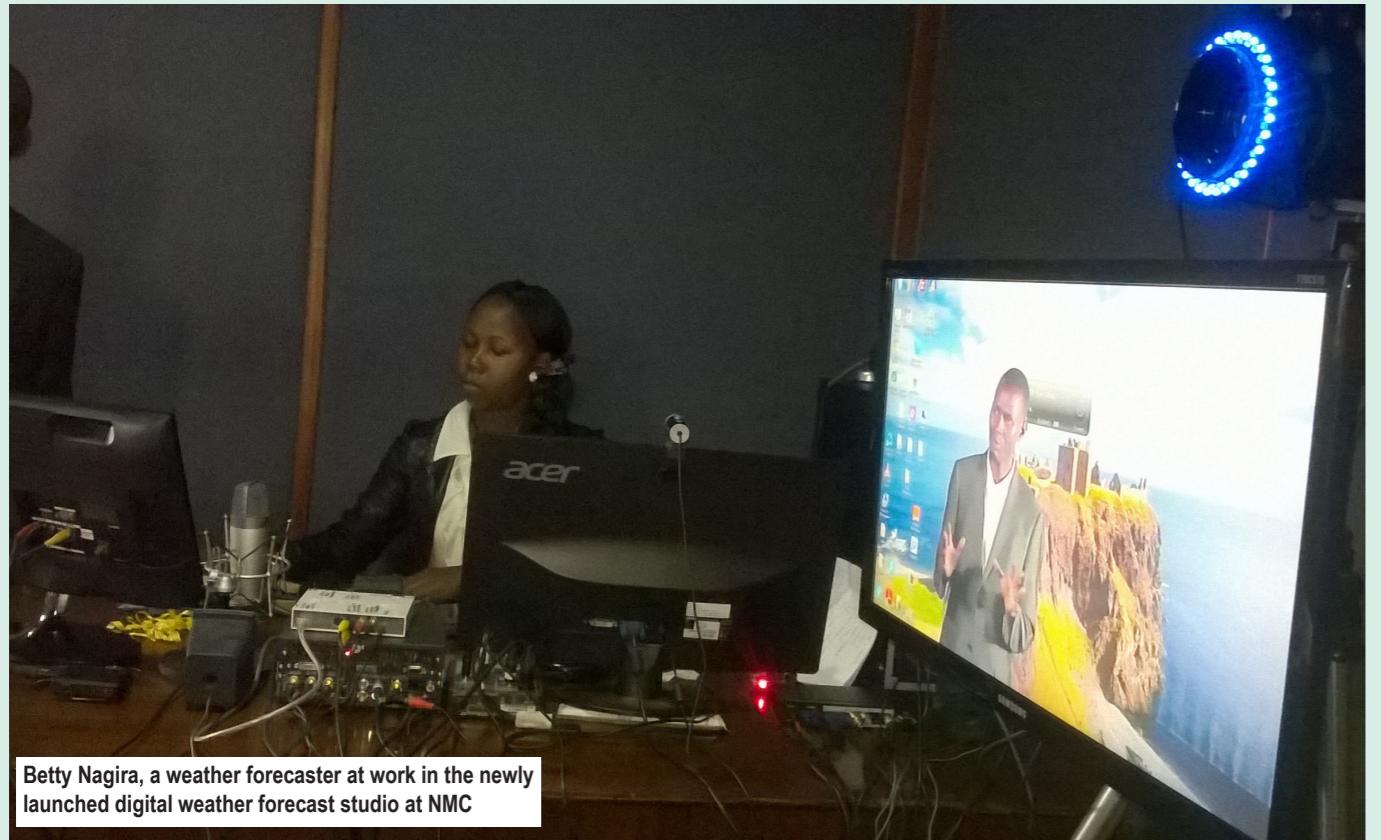
In order to ensure that the proposed programme is demand-driven and accommodates the views and perspectives of different stakeholders, the DIT conducted a consultative stakeholders' workshop to give an opportunity to different stakeholders to share their views and recommendations on it.

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DIT Curriculum review Stakeholder's workshop

METEOROLOGY DAY: UNMA GOES ONLINE



By Rebecca Rugyendo
and Doreen Nerima

On March 23, 2015, the Uganda National Meteorology Authority (UNMA) joined the rest of the world to mark the World Meteorological Day with celebrations that took place at the Directorate of Water Resources Management complex. These celebrations attracted stake holders in the Water, Environment, Climate and Weather fields. Several UNMA donors and project partners like

GIZ (German Cooperation) the United Nations Development Programme (UNDP) and Weather Information Management for East Africa Using Suitable ICTs (WIMEA-ICT) attended. The guest of honour, the State Minister for Water and Environment, Prof. Ephraim Kamuntu presided over the function which included, among other things, the commissioning of UNMA's new offices, the launch of a new digitised weather studio and unveiling the much anticipated UNMA website (www.unma.go.ug).

Digitally speaking, UNMA has come a long way. According to John Eza, a supervisor at National Meteorology Centre (NMC) who has worked in this department since 2005, the best is yet to come. When we sought his views on the extent to which ICT is being used in weather forecasts and dissemination, he was open about things not being so rosy in the past but positive that they are on their way to improving. "Five years ago, we did not have as much IT in our operations as we have today.

Every passing quarter or year, we see that the involvement of ICT is invaluable in our work, right from observation of weather up to when this information is released for public service systems," he says. Eza maintains that initially, since they were a department (DoM) under the Ministry of Water and Environment, they had budgetary constraints and so could not do much to better the situation. However, with the current transformation to a semi autonomous entity, UNMA hopes to attract a number of development partners thus envisioning an acquisition of some high level digital equipment they need to upgrade to a modern weather centre. "We are also

working with regional centres to come up with systems that are uniform throughout the country, right from training institutions to the broadcast office," he says.

Uganda has been favoured by nature and so does not have extreme weather conditions that are life threatening like it is in the northern and southern hemispheres. It is perhaps because of this that the Government of Uganda did not consider weather important enough to fund and streamline it so that it can be included in the social economic development

of the nation. If it was not for world meteorological bodies, this department may probably have been scrapped off mostly because they didn't understand its importance. However, with the severe climatic changes globally, Uganda cannot afford to stay primitive. It is time to change.

Our tour to NMC was quite eye-opening. Evidence of old furniture, one or two computers lingering on a desk or two, and a general state of resignation greeted us. Most of the meteorology assistants and meteorologists we talked to gave us the same story of how things have been and the ray of hope that has come with the transition of DoM to UNMA.

(Continued on page 8)



Digitalization, rescue of weather data

(From page 7)

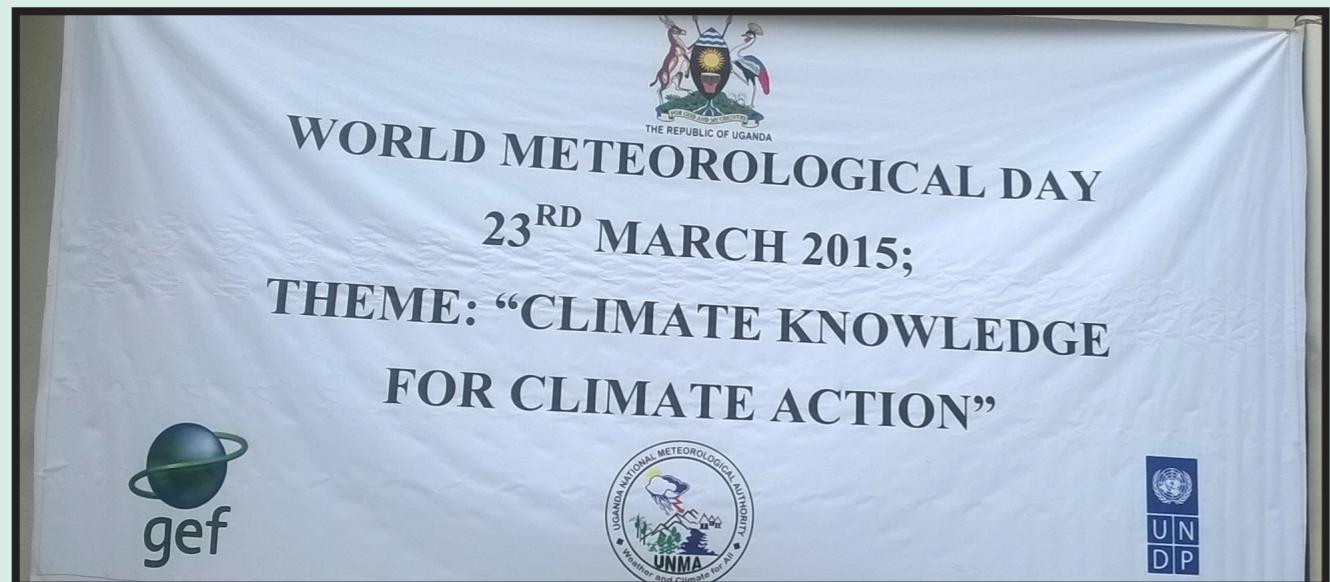
For instance, many people who watch the UBC weather forecast may not appreciate what it takes to produce them.

"Originally, somebody would go to the weather studio, read and present the weather data which would be recorded on a tape. That tape would be taken to UBC physically; everyday, using the department's staff bus that would be dropping off workers who would be on day shift and UBC would play the tape," says Isaac Mugume, a meteorology PhD student being sponsored by

a graphics person and recorded. The forecast recording is done by 4:00pm, packaged (on computer) and sent via email to UBC using the Dropbox system, an internet based file hosting service that facilitates easy sharing of files. That is a step in the right ICT direction and we commend UNMA for the strides they have made so far. We now know change has come.

Betty Nagira, a weather forecast producer and presenter at the National Meteorology Centre (NMC) pointed out that although

Meteorology Centre. Ideally, there should be several smaller, well equipped mobile weather stations between here (Entebbe) and Kampala to feed us with data. But there is none. Most of the weather stations still have old manual equipment. Therefore, by the time data comes to us, there are many irregularities," she says. She believes that now that UNMA is an authority; it will regulate the flow of weather information to the public. Some radio and TV stations simply go to the internet and pick information which



WIMEA-ICT.

When we visited, we were happy to note that there has since been an upgrade in the system. With the commissioning of the new studio, trips to UBC are a thing of the past. When the weather data is collected from automatic and manual weather stations, at about 3:00pm, it is downloaded on computers in the studio using the Internet. It is analysed, mixed by

strides have been made to introduce ICT in their work, a lot more needs to be done. "There are two people in this studio, the one who mixes the graphics and the presenter. However, compared to international standards, ours is way below par. It is very small. We need bigger space, more personnel and equipment," she says. She further says, "We are the National

they do not understand. They erroneously announce it to the public, "predicting" how hot or cold the day will be. That is not acceptable.

UNMA ON FACEBOOK/ TWITTER

Since 2009, GIZ has supported the Department of Meteorology (now UNMA) in weather forecasting, climate modelling,



Alex Kim, a weather forecaster (presenter) in the weather studio at NMC



(SCIEWS) PROJECT

The expansion of Station Networks, field vehicles for data collection, station monitoring and the digitalization and rescue of climate data. They have also provided computers and IT infrastructure for data processing and management. Indeed, quite a lot has been done by GIZ to ensure that meteorological data and information, especially in the agricultural sector are disseminated through various channels with intermediaries and end users having the ability to utilize the services. This project is driving UNMA in the right direction.

To this end, WIMEA acknowledges efforts made by GIZ to accelerate the corporate branding of UNMA through the development of the official UNMA website (www.unma.go.ug). It has also integrated UNMA on social media platforms ([Facebook-UNMA weather](#)) & twitter handle ([UNMA@meteoUganda](https://twitter.com/UNMA@meteoUganda)).

STRENGTHENING CLIMATE INFORMATION AND EARLY WARNING SYSTEMS

The United Nations Development Programme, under the Energy and Environment Unit has partnered with UNMA to undertake a project called Strengthening Climate Information and Early Warning Systems (SCIEWS). The main goal of the SCIEWS project is to improve the country's capabilities to provide timely weather information and early warning systems to minimize the impact of climate related disasters. The project has procured Automatic Weather Stations. In addition, NMC is being connected to initially six synoptic stations by May 2015. This will improve on data flow from the monitoring stations to the NMC.

Laurent-Mascar Ngoma, the Programme Manager says UNDP is interested in building UNMA's capacity to run like a modern weather station.

"We have procured several Automatic Weather Stations. As part of the capacity building, we have procured Weather balloons, thermometers, and set up 16 functional weather

stations. These weather stations have both manual and automatic equipment. It should be noted that the budget has been small, thus most of the equipment at stations has not been maintained and so is not operational," she says.

Ngoma says although they have an office in Entebbe that receives weather data and distributes it, they do not use computer software to analyse it. They have a computer or two with the software but because they were not maintaining it, it stopped working.

This therefore gives credence to the fact that although these projects have contracted registered considerable success, weather information management and dissemination is still in need of an ICT revolution.

With all these developments going on, WIMEA-ICT is proud to be one of the partners in this noble cause to set up modern weather information management systems. This will ensure timely and accurate dissemination of weather information to those who need it.

METEOROLOGY CURRICULUM NOW GENDER SENSITIVE

By Agnes Rwashana Semwanga (PhD)

It is widely acknowledged that science disciplines have been portrayed as masculine, a fact that makes most females shy away from attempting to study them. Consequently, there has been a need for activities, strategies and methodological practices to promote gender awareness in meteorology.

Dr. Agnes Rwashana Semwanga, the gender component leader on the WIMEA-ICT project has worked closely with Dr. Kabonesa and Dr. Peace Musiimenta from the School of Gender in ensuring that aspects of gender are adopted in the PGD, Bsc and Msc. programmes.

In December 2014, various academic staff and Heads of Departments attended a gender based workshop whose main aim was to ensure that gender aspects are integrated in the design, implementation and evaluation of the curricula.

The workshop was specifically prepared so that aspects of gender would be incorporated in the mode of delivery, learning outcomes and admission requirements of the BSc Meteorology, PGD Meteorology and MSc in Applied Meteorology curricula.

BSC METEOROLOGY CURRICULUM

In ensuring that the BSC Meteorology curriculum is engendered the following have been incorporated in the curriculum outline:

1. Two courses namely; **UNV 1002 Introduction to gender** and **ENV 2110 Gender and Environment** will be taught as core courses of the programme

2. Gender considerations have been built-in several courses as highlighted below :



GENDER ASPECTS IN THE PGD PROGRAMME HAVE BEEN INCORPORATED IN THE FOLLOWING APPLICATION COURSES.

- GMR 6112 – Research Methods and Computer Applications in Meteorology
- GMR 6209 – Agro-Meteorology
- GMR 6210 – Hydrometeorology
- GMR 6211 – Climate Change and Socio-Economic Implications

been included in the course.

Theories of communication plus communication means such as radio, posters should take into account gender issues during the course.

• MET 1202 Climatology course

Aspects of gender related to the causes, and consequences of climatology will be discussed.

• MET 2101 Research Methodology course

Aspects of qualitative research methods that take care of women's voices regarding climate changes and their effects and indigenous knowledge on conservation have been incorporated in the course.

- Gender component is integrated in



ISSUES SHARED IN THE MENTORSHIP MEETING INVOLVED:

- Overview and Importance of the field of meteorology
- Career opportunities in meteorology
- Examples of female role models who have excelled in the field of meteorology
- Meteorology graduate programmes at Makerere University
- Short meteorology courses in other universities
- Setting goals towards career improvement.

ENV 2111 Soil conservation and environment, MET 2206 Renewable Energy Resources, MET 3102 Meteorology and Human Environment , MET 3201 Climate Change, adaptation and mitigation, MET 3203 Elements of Environmental Pollution and Control and ENV 3112 Water Resource Management.

• MET 3105 Agro-meteorology course incorporated gender aspects since women form the majority of population in agriculture.

POSTGRADUATE DIPLOMA IN METEOROLOGY

The PGD programme was designed to introduce the field of meteorology to science graduates who are joining the field of meteorology from different science fields. It runs for one year and yet there was a lot to be

covered making it difficult to incorporate standalone courses in gender.

ECONOMIC IMPLICATIONS MASTERS OF SCIENCE IN APPLIED METEOROLOGY

As far as engendering the MSC in Applied Meteorology is concerned, two courses namely MET 7102 – Research Methods and Data Analysis and MET 7301 – Graduate Seminar were revised and gender aspects have been incorporated. Gender aspects will be extensively discussed in the graduate seminars as well as in the proposal writing and considerations while addressing ethical issues.

Other gender activities that have been done include visits to institutions with female role models to encourage the younger

THE FOLLOWING CONSIDERATIONS WERE RECOMMENDED TOWARDS ENCOURAGING FEMALES IN ENROLLING IN METEOROLOGY PROGRAMMES

i). Efforts in the call for applications will be made to encourage female applicants and visits to the lower levels of education. Targeting secondary school will be done to make the meteorology career more attractive to females.

ii). Uganda National Meteorological Authority has a duty to publicise and create awareness to the public about the field of meteorology. They promised to take part in incorporating gender in their training.

iii). Guest lectures like seminars for all post graduate programmes will be set up to enable students understand gender from a broader perspective.

iv.) Re-tooling workshops for staff will be organized to enable them appreciate the importance of gender, thereby enabling them to incorporate gender aspects in their training.

ones to take up science courses and to apply during the university admissions. Ms. Lukya Tazalika, the Ag. Commissioner, Forecasting in the National Meteorological Authority and Dr. Agnes Rwashana Semwanga from Makerere University, College of Computing and Informatics Technology visited the National Meteorological Training School on September 23, 2014 and encouraged students to read about the course.

The University of Juba is ready to be boosted



Ben Salibaa from the University of Juba

The revision of BSc in Meteorology programme at the University of Juba is being undertaken to train Meteorologist to serve in the different sectors of economy.

Why meteorology, one may ask. In the Republic of South Sudan, and Africa in general, meteorologists and climate scientists are needed in vital areas of the economy such as agriculture, fisheries, the water sector, weather forecasting, aviation, and disaster mitigation.

Due to their impact on human livelihoods, these areas are crucial in achieving the Millennium

at the University of Juba is non-functional due to lack of qualified teaching staff following the separation of the Republic of South Sudan from Republic of Sudan.

As a result, few South Sudanese who wanted to pursue their undergraduate study in Meteorology had to travel to undertake the study abroad – a practice which was costly and failed to address capacity building in the local Higher Educational Institutions and industry.

Secondly, the current programme content is shallow,

Development Goals.

South Sudan, the youngest country in Africa at the moment, desperately needs a degree programme in Meteorology and Climate Science for training the needed manpower to address the lack of trained specialists in the above mentioned areas.

Objectives of the course

The current BSc in Meteorology

is being undertaken to train Meteorologist to serve in the different sectors of economy.

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incoherent and lacks some basic courses for producing highly qualified meteorologist with high quality knowledge of fundamental physical science and up-to-date current meteorological knowledge and skills including forecasting, experimental, theoretical and research techniques.

Hence, activating this programme with an effective programme content and training methodology is necessary to train more South Sudanese Meteorologists to provide the critical Meteorological services and information to the end-user for socio-economic development of the country.

Therefore, the proposed reviewed BSc Meteorology programme in the University of Juba is to equip prospective students with high quality knowledge of fundamental physical science and up-to-date current meteorological knowledge and skills, to ensure first and foremost the training of South Sudanese students locally in order to cut down on costs of training them elsewhere.

It is to develop and expand to provide a center of excellence in climate research at the University of Juba to benefit not only the nation, the sub-region of East Africa but Africa and the world at large.

We hope to build human capacity by training and producing South Sudanese graduates with high quality fundamental physical

“ South Sudan, the youngest country in Africa at the moment, desperately needs a degree programme in Meteorology and Climate Science for training the needed manpower to address the lack of trained specialists in this field ”

sciences, up to date current meteorological knowledge and skills that includes forecasting, experimental, theoretical and research techniques, expert knowledge in the physical climatic processes of tropical Africa, to have appropriate technical and managerial skills in Meteorology, to have appropriate knowledge and skills to undertake research in Meteorology and other related issues. It is to also have the social, economic and management qualities.

We are excited about this programme because the undergraduate programme in Meteorology at the University of Juba is a five-year programme leading to the award of BSc (Hon) in Meteorology.

This programme will provide students with opportunities to develop and demonstrate

knowledge, skills and other attributes in the field of Meteorology and related areas necessary such as Physics, Mathematics, Electronic, Computing, areas of physical sciences.

Teaching/learning methods and strategies

By the end of the course, students will have gone through lectures, workshops, problem-based learning, electronic resources, small group's tutorials, course work, directed study, feedback from assessment and practical work at each level, together with an investigation that will be undertaken in the final year.

Students will be assessed through examinations, practical examinations, in-course assessments in form of laboratory reports and logbooks, class tests,



Ben Khemis, University of Juba

course work assignments, Oral and poster presentation.

While undertaking this curriculum revision, The University of Juba is being supported by scientists from the University of Bergen and Makerere University. It is planned that the first few years of implementing the curriculum, the support will continue

COMPUTATIONAL ENGINEERS

According to the Tanzania Investment Center (TIC) 2008/09 report, a more than 60% shortage of workers will be created by investments of different stakeholders in the related fields of Computational Science. With this in mind, the course will help create highly skilled workers in the country's market and worldwide

(From page 5)

Four papers were presented during this stakeholders' workshop. The first paper was a summary of Competence-Based Curriculum Development. The paper outlined the concept of competency

in CBET, framework for curriculum development, CBET overview, curriculum development process, implementation strategies and approval structure.

The second paper was a summary of the Situation Analysis Report for the establishment of Master in Computational Science and Engineering programme. The presentation highlighted key issues such as the need for establishing the programme, reasons and objectives for conducting a situation analysis, the methodology used, key findings and conclusions.



Dr. Amos Nungu at the DIT curriculum stakeholder's workshop

The third paper was about the proposed Masters in Computational Science and Engineering programme Curriculum Information Report. It was explained that MCSE is a programme at NTA level 9 according to NACTE standards.

The fourth paper explained the implementation strategies of the proposed programme. In this presentation, the programme delivery, human and physical resources were briefly presented.

Finally, the stakeholders accepted the presented proposal for the establishment of Master in Computational Science

and Engineering programme at DIT.

PROPOSED BENEFITS

The purpose of this programme is to equip students and the Tanzanian society with current knowledge and best practices in Computational Science and Engineering

that will be beneficial to the growth and sustainability of the Tanzanian economy.

The study also revealed that the proposed training programme will produce skilled personnel in Computation Science and Engineering in areas such as weather and climate, health, commercial and economic activities, High Performance Computing, Oil and Gas, Energy, Research development, Petroleum and Mining sectors. This programme will as well directly or indirectly be useful to almost all development sectors inside and outside the country.



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