

DECEMBER 2023

# ACE II NEWSLETTER



## ACE II BOOSTED FEMALE ENROLMENT RATES

**AntiFert - A Breakthrough Solution for Sustainable Rat Control**

**ACEs Revolutionising Higher Education for Regional Development**

**ACEIDHA Secures €2 Million in EU Funding**

**NMAIST becomes a leading Digital Education Hub in East Africa**

**Student invents Swahili Chatbot to Support Farmers**



visit [ace2.iucea.org](https://ace2.iucea.org)



# Contents



**2** AntiFert - A Breakthrough Solution for Sustainable Rat Control



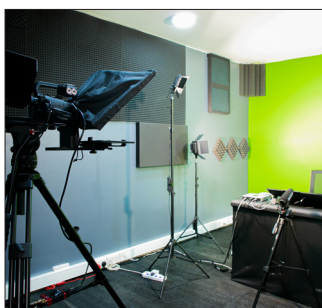
**4** ACEs Have Revolutionised Higher Education for Regional Development



**6** ACEIDHA Secures €2 Million in EU Funding for FoSTA-Health Project



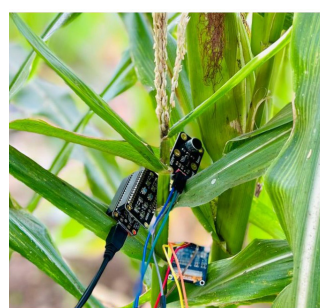
**8** ACE II Empowers UNIMA and University of Rovuma to Foster Collaboration



**10** NMAIST becomes a leading Digital Education Hub in East Africa with C-CoDe Initiative



**16** CREATES in Tilapia Cage Fish Farming collaboration to enhance nutrition



**23** Student invents Swahili Chatbot to Support Farmers



**26** ACE II Boosted Female Enrolment Rates



## Editor

Agnes Asiimwe Okoth

## Contributors

Abtamu Tahir Mohammed  
Elizabeth Mushi  
Jean Damascène Niyitegeka  
Alfred Nyongesa Wandera  
Jimmy Kainja  
Inacio Jonas  
Janeth Muro  
Cliff Kawanga  
Damaseke Chibale

## DECEMBER 2023

ACE II Newsletter Copyright © 2023

Inter-University Council for East Africa,

Regional Facilitation Unit

ACE II Project, Kigobe Road, Kyambogo

P. O. BOX 7110 Kyambogo Kampala, Uganda

Email: [ace2rfu@iuea.org](mailto:ace2rfu@iuea.org) Twitter: @Ace2Africa

Your thoughts and stories are welcome. To contribute to the next newsletter send your submission to [aasiimwe@iuea.org](mailto:aasiimwe@iuea.org)

**ON THE COVER:** Dr Clarence Paul and Dr Rebecca Walugembe graduated with PhDs in Water Management on July 20th 2023, from the Africa Center of Excellence in Water Management at Addis Ababa University

# Nurturing a Passion for Water at Addis Ababa University

Ahmed Mohamed, originally from Somalia with its vast coastline, nurtured a profound love for water, epitomized by his favorite Somali proverb, "Save water, and it will save you."

**H**is dream came true in late 2021 when he received an MSc admission from the Africa Center of Excellence for Water Management (ACEWM) at Addis Ababa University. Having completed his undergraduate degree in Ethiopia, he felt a deep connection to his second home.

Graduating with an MSc in Water Quality Management in July 2023, Ahmed cherishes the diverse cultural interactions with classmates, even fluently speaking Amharic, one of Ethiopia's widely spoken languages.

Foreign students from Southern and Eastern Africa share Ahmed's sentiment, relishing ACEWM's dynamic and multicultural environment, enhancing their understanding of water management.

Clarence Paul, from Tanzania, faced a tough choice relocating for a four-year PhD program at ACEWM. She lauds the excellent facilities, multicultural setting, and supportive management, ultimately earning her Ph.D. in Hydrology and Water Resources Management, alongside her Ugandan friend, Rebecca, specializing in Aquatic Ecosystems Management.

Professor Feleke Zewge, ACEWM's Director, emphasizes the significance of a multicultural approach in addressing water-related challenges plaguing Eastern and Southern African countries, and fostering a network of experts to tackle regional water issues.

<https://acewm-aau.org/>









# AntiFert - A Breakthrough Solution for Sustainable Rat Control

Rats, often perceived as cunning, have plagued communities worldwide. African farmers witness their crops ruined in fields and storage, Asian paddy fields lose 50% of their harvest, and urban residents fret about rats infiltrating homes and causing havoc. Moreover, rats carry diseases that can threaten human health and even lead to fatalities. Despite our technological progress, controlling these pests in fields and houses remains a challenge.

Traditional methods of poisoning and trapping lead to short-lived satisfaction as the surviving rats thrive on increased resources and multiply rapidly. The enduring struggle to manage rat invasions underscores the need for innovative and sustainable solutions in pest control.

The Africa Center of Excellence for Innovative Rodent Pest Management & Biosensor Technology Development (IRPM & BTD) at Sokoine University of Agriculture wanted to develop an innovative solution to counter this problem. The question was *"Can we make rats produce fewer young or stop them from producing offspring?"* The idea of fertility control, just as it has been successfully applied for humans, was our immediate opinion. If we could use a fertility control hormone, in form of a reproductive inhibition pill for rats, then numbers will be small, no dead rats, but just a few

infertile rats. We embarked on finding a suitable synthetic hormone, but ultimately came up with two, which we started experimenting on for a period of four years. Not only did a mixture of the two synthetic hormones incorporated in edible bait reduce sperm production in male rats, but it also reduced sperm movement, increased sperm mortality and deformity, to the extent that male rats became infertile and could not fertilize females.

For the females, the uterus became filled with a liquid (assumed to be water) and were practically infertile because they could not conceive at all. This was a major breakthrough in our research on fertility control. We soon embarked on field trials after the success of our laboratory experiments and we were able to demonstrate that when the bait was applied in the field it remained effective for about 90 days, which was an enough duration

to reduce field rodent populations to levels that were not economically damaging to farmer's crops. So, fertility control of rats was a workable solution to reduce rat populations and prevent rat outbreaks in the field.

The new product that we formulated was named *AntiFert* and has been registered as a rodent control product in Tanzania. Soon the product will be available commercially for farmers to use in their fields, three months before they plant their crop. This is a major development in rodent management in Africa, particularly to achieve the goal of ecologically-based rodent pest management. This is one of our best success stories for rodent pest management in which poisons will no longer be applied and the negative environmental impacts associated with them will no longer be a concern.

<https://afrirodents.sua.ac.tz/>

# ACES HAVE REVOLUTIONISED HIGHER EDUCATION FOR REGIONAL DEVELOPMENT

The ACE II project was initiated in 2015/2016 to collectively support selected

higher education institutions from the republics of Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, and Zambia, in delivering quality postgraduate education and research. The project was established at the time when the East and Southern Africa was lacking critical high-level skills in agriculture, education, health, industry and data science. Moreover, while higher education institutions were experiencing increasing enrolments, the number of students enrolled in science, engineering and technology was relatively low.

## **The Struggle for STEM Talent**

Despite the surge in student enrolments, there was a glaring gap in faculty qualification. Very few lecturers held PhD degrees, and the number of specialized PhD graduates in science, technology, and engineering was dishearteningly low, with only about 100 such individuals produced each year.

The situation was reflected in the region's research and innovation output, which contributed less than 2% to the global research landscape and a mere 0.1% to global patents. Collaboration in research was mainly international rather than intra-African, further isolating the region from the global knowledge ecosystem.

## **Collaboration Challenges**

National and regional collaboration in research was limited, with only 30% of publications in Eastern Africa and 20% in Southern Africa resulting from joint efforts. Notably, less than 2% of scientific publications from countries like Ethiopia, Kenya, Malawi, Mozambique, and Zambia focused on engineering, energy, and technology.

Universities were unable to effectively engage with industry, and the industry lacked confidence in universities' capabilities to produce graduates capable of solving real-world problems. Several barriers hindered collaboration, including a lack of knowledge about industry needs, limited capacity for brokering agreements, and a lack of know-how in showcasing research outputs and applications.

## **A Vision for Change**

Recognizing the need for change, the World Bank and the republics of Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda and Zambia agreed to invest in high-level skills, focusing on MSc and PhD programs. They aimed to build research and innovation capacity and adopted a regional approach to overcome resource constraints, gender disparities, and faculty shortages in critical sectors like Agriculture, Education, Health, Industry, and Applied Statistics.

Their ultimate goal was to sustain economic growth, reduce poverty, produce high-skilled human resources, and enhance competitiveness and employment opportunities.





### **The ACE Initiative**

To achieve these objectives, the Africa Centers of Excellence were established, focusing on building institutional capacity, conducting high-quality research, and fostering partnerships with academic institutions, industries, and the private sector. Their mission was to improve governance and management while delivering outreach and societal impact through teaching and research.

The project set ambitious targets, aiming to enroll 3,500 graduate students, publish 1,500 journal articles, launch over 300 research collaborations, and generate \$30 million in external revenue.

### **Remarkable Achievements**

Despite facing challenges, the Centers of Excellence surpassed many of their targets, enrolling 7,226 national and

regional students, of which 2,558 were females. Faculty and PhD student exchanges flourished, internationally recognized research publications soared, and academic programs earned accreditation.

Collectively, the ACEs have generated \$43 million, surpassing their \$30 million target, demonstrating their potential for impact, growth and sustainability. In addition to education, the ACE Initiative established incubation centers specialised in energy, biotechnology and traditional medicine, phytochemicals as well as data driven innovation. These incubation centers have helped researchers and young innovators to conceptualize, develop, and test products for commercialization, and launching of start-ups and companies at national, regional, and international scale.

### **Model of Excellence**

The success of the ACE Initiative was attributed to organizational leadership, a robust financing model, effective monitoring and evaluation systems, and valuable partnerships. This project was a testament to the effectiveness of the ACE Model in delivering development outcomes, improving accountability, and driving quality and quantity of research and innovation. The ACE Model can enhance the quality, relevance, and management of higher education in the Sub-Saharan Africa region, contributing to the region's development. It was a beacon of hope for a region striving to unlock its true potential and create a brighter future.

# ACEIDHA Secures €2 Million in EU Funding for FoSTA-Health Project

The Africa Centre of Excellence for Infectious Diseases of Humans and Animals (ACEIDHA), within the Faculty of Veterinary Medicine at the University of Zambia, has successfully secured 2 million Euros (€2,000,000) in funding through the European Union (EU)-supported project known as Food Systems Transformation in Southern Africa for One Health (FoSTA-Health).

This 3.5-year project is designed to create ambitious and inclusive visions as well as action plans to transform food systems with the goal of achieving positive One Health outcomes across four central transformation agendas. These transformation agendas include:

1. Diversification of maize production systems.
2. Land use change and irrigation development.
3. Transition from domestic to export markets.
4. Dietary diversification.

ACEIDHA Centre Leader, Prof. Bernard Hang'ombe, expressed that the project's primary objective is to identify and emphasize the complex system dynamics linking food systems transformation to a wide array of animal, environmental, and human

health outcomes.

Prof. Hang'ombe further explained, "The FoSTA-Health initiative constitutes a strategic and extensive consortium involving 13 partner institutions from both Europe and Africa, specifically Malawi, South Africa, Tanzania, and Zambia. Its focus lies in achieving the best health outcomes that will transform Africa into a safer and healthier haven for humans, animals, plants, and their shared environment."

Leveraging evidence drawn from case studies conducted in Malawi, South Africa, Tanzania, and Zambia, the FoSTA Project will subsequently formulate inclusive visions and action plans for food systems transformation, aimed at achieving positive One Health outcomes in southern Africa.

<https://aceidha.unza.zm/>









# ACE II EMPOWERS **UNIMA** AND **UNIVERSITY OF ROVUMA** TO FOSTER COLLABORATION

Part of the exhibitions of the students' work.





The University of Malawi (UNIMA) and the University of Rovuma-Niassa Extension in Mozambique have signed a Memorandum of Understanding (MoU) aimed at strengthening the relationship between the two universities and improving standards in research, teaching and innovation.



Professors Sajidu (left) and Brito dos Santos (right) signed the MoU.



The collaboration was made possible by the World Bank financed ACE II project, through the Centre for Resilient Agri-Food Systems (CRAFS). The MoU was signed by the UNIMA's Vice Chancellor, Professor Samson Sajidu and the Rector of the University of Rovuma, Professor Mário Jorge Brito dos Santos.

The agreement between the two Universities is an outcome of the ACE II project, which, among other objectives, seeks to strengthen regional collaborations. The two Universities, located in Zomba, south of Malawi, and Lichinga, north of Mozambique, respectively, are only 300 kilometres apart but have not been able to work closely in the past.

Recognising the importance of the collaboration, Professor Sajidu described it as a source of satisfaction and a watershed for the two Universities and reiterated that UNIMA, through CRAFS, is determined to offer joint degree

programmes, strengthen student and staff exchange programmes, and adhere to international standards of research and innovation, which are crucial for a quality university education. He said the MoU partnership takes UNIMA in the right direction towards its contribution to Malawi's Vision and the University's 2022 – 2027 Strategic Plan which includes increasing access to higher education.

On his part, Professor Brito dos Santos said that the MoU makes sense for the two universities given a history of shared resources such as Lake Niassa, Shire River and railway transportation between the neighbouring countries. Thus, he believes the MoU represents a turning point for the two universities as it will allow the implementation of joint projects in research, teaching and innovation.

Other activities at the occasion included an exhibition of Rovuma students' work.





# NMAIST becomes a leading **Digital Education Hub** in East Africa with C-CoDe Initiative



The Nelson Mandela African Institution of Science and Technology (NM-AIST) is poised to become one of the digital hubs within the East Africa Community (EAC) following the inauguration of the Centre of Competence in Digital Education (C-CoDE) on October 2, 2023.



The C-code is hosted at NM-AIST through the Centre for Water Infrastructure and Sustainable Energy Futures (WISE-Futures). The C-CoDE is established within the framework of the Excellence in Africa initiative, a collaboration between Mohamed VI Polytechnic University (UM6P) of Morocco and the Ecole Polytechnique Fédérale de Lausanne (EPFL) of Switzerland.

The aim of the centre is to promote the sustainable integration of digital education in African universities as a means to strengthen the quality of teaching and ultimately the competencies of graduates.

With a construction cost of over 100,000 US dollars, the state-of-the-art facility will be equipped with a professional studio complete with camera setups, lighting, internet access, and soundproof materials. This setup will enable live streaming and recording of educational content for teaching online.

Speaking during the centre's inauguration, the Ag. Director of Science, Technology, and Innovation at the Ministry of Science and Technology, Professor Ladslaus Mnyone, underscored the role of the facility in advancing education provision in Tanzania.

He said that embracing technologies and coping with rapid technological advancements had a significant impact on both professional and personal experiences.

"We must prioritise the digital education agenda to enhance learners' capacity while being mindful of addressing potential

negative impacts of Information Communication Technology in the learning process," he said.

Prof. Mnyone equally challenged stakeholders in the ICT sector to come up with a national strategic plan in science, technology, and innovation to strengthen digital literacy in Tanzania.

"Our differences notwithstanding, our shared desire to provide opportunities to address socio-economic challenges will drive us forward," he observed.

NM-AIST's Vice-Chancellor Professor Maulilio Kipanyula noted that the centre will serve as a research hub that inspires the next generation of learners, equipping them with invaluable tools and knowledge to address pressing societal issues.

The WISE-Futures centre leader Professor Hans Komakech said C-CoDE had so far trained three faculty as experts in digital education, 10 faculty in digital education master classes, and two technical personnel as computer system engineers and multimedia specialists at UM6P. The trained team will start the implementation of C-CoDE digital training.

NM-AIST's is one of six universities to benefit from the program. Other universities include Kabale University in Uganda; the University of Abuja in Nigeria; École Supérieure Multinationale des Telecommunications in Dakar, Senegal; Université Nangui Abrogoua in Abidjan, Ivory Coast; and Moi University in Kenya.

<https://www.wisefutures.ac.tz/>

# WISE-Futures attains International Accreditation of Two Programs

WISE-Futures has played an essential role in strengthening the quality of education at The Nelson Mandela African Institution of Science and Technology - NM-AIST. Since 2017 the center has provided invaluable support for the development and strengthening of 18 MSc and PhD programs across the Schools of Materials Energy, Water, and Environmental Sciences (MEWES), Business and Humanities (BuSH), and Computational and Communication Science and Engineering (COCSE), in collaboration with the Tanzania Commission for Universities. Sixteen programs have already received accreditation, while two programs are currently undergoing evaluation.

In 2020, the center initiated international accreditation of two postgraduate programs: Master of Science in Materials Science and Engineering (MSc. MaSE) and the Doctor of Philosophy in Materials Science and Engineering (PhD. MaSE). Despite many challenges

faced along the way, the center is proud to announce the approval of the above-mentioned programs. Thanks to the international accreditation of these programs, the institution has positioned itself to compete at the international level, and it stands ready to welcome students from around the globe.

These programs received accreditation from the Agency for Quality Assurance (AQAS) in Germany. They will be offered at NM-AIST under the School of MEWES. Students will benefit from this accreditation as these programs guarantee the global recognition of their education, and offer a wide range of opportunities ultimately enhancing their career prospects and academic growth.





Two postgraduate female students of Moi University's Africa Centre for Excellence in Phytochemicals, Textile and Renewable Energy (ACEII PTRE) have separately won PhD scholarships and an award in the category of young talents from Africa.



## ACEII PTRE Female Students Win PhD Scholarships, ENI Award 2023

Ms. Hortence Ingabire, a Rwandan national, has been awarded a PhD Scholarship by the Federal Technology University of Parana (UTFPR), Curitiba Campus in Brazil. On the other hand, Ms. Elshaday Mulu Fetene, an Ethiopian national, was in August feted with the Eni Award 2023 in the category of Young Talents from Africa.

Ms. Fetene's excellent Master of Science in Energy Studies thesis at Moi University on the production of biohydrogen from fruit and vegetable waste, particularly abundant in Ethiopia, using catalysts from low-cost natural and synthetic materials, deservedly won her the award.

ACEII PTRE Centre Leader, Prof. Ambrose Kiprop, said ACEII PTRE celebrates Ms. Fetene as one of the winning researchers and scientists of the fifteenth edition of the Eni Award, a prize established in 2007

that has become an international reference point for research in the fields of energy and environment.

The Eni Award aims to promote radical breakthroughs in energy efficiency, renewables, decarbonization and safeguarding of the environment, stimulating the work of new generations of researchers. The award testifies to the importance that Eni places on talent, scientific research and innovation.

Prof. Kiprop said the Centre is even more proud that Ms. Fetene's award came along with a three-year PhD scholarship to study at any Italian University.

Likewise, Ms. Ingabire who pursued Master of Science in Energy Studies (Renewable Energy) in the Department of Mechanical, Production and Energy Engineering at Moi University reported to UTFPR on October 1, 2023 to pursue a PhD in Electrical Engineering and Industrial Informatics, specializing

in Automation and Systems Engineering.

Ms. Ingabire's scholarship is sponsored under the GCUB International Mobility Programme. The GCUB International Mobility Program (GCUB-Mob) is coordinated by the International Cooperation Group of Brazilian Universities (Grupo de Cooperação Internacional de Universidades Brasileiras - GCUB), a consortium that brings together 89 Brazilian Higher Education Institutions (HEIs), public and private.

GCUB-Mob offers Masters and Doctorate scholarships to students from five continents, with the goal of contributing to their academic development, as well as promoting the internationalization of Brazilian higher education and strengthening international cooperation between Brazilian and foreign HEIs.

<https://excellencecenter.mu.ac.ke/>



# ACENUB welcomes Postgraduate students

The African Centre of Excellence in Neglected and Underutilised Biodiversity (ACENUB) at Mzuzu University in Malawi has welcomed its first cohort of international post graduate students.

Speaking during the orientation to students under the ACENUB Scholarship on October 3, 2023, the centre's director Associate Professor Mavuto Tembo said food and nutrition insecurity are major development challenges in Sub-Saharan Africa because of overdependence on few selected cereals and root foods.

"Our centre believes that training and research are a foundation of development. A clear and targeted research will unlock the potential of neglected and underutilised biodiversity," he said.

Tembo said Sub-Saharan Africa is well known for its variety of foods but surprisingly, there are more nutritionally insecure people who

depend on selected staple crops prioritised in agricultural policies.

"The most food and nutrition insecure population are the majority poor smallholder farmers living in the rural areas. The food system is failing to meet the demand of food and nutrition, create small businesses and enterprises and take advantage of urban and rural commodity market linkages and communication technology. I am hopeful that these issues should be tackled in the research that you will conduct," he said.

Ms. Jesca John is a Master of Science in Fisheries and Aquatic Science student from Tanzania.

"I would like to conduct research which I had no opportunity of

doing as an undergraduate student and possibly publish my work. There is need for sub-Saharan countries to utilise the resources and biodiversity for better welfare and commercialisation," she said.

Another student, Ms. Sophie Kibebe from Kenya, said she enrolled for a Master of Science Degree in Transformative Community Development because she is passionate about the welfare of people in communities.

ACENUB offered 14 scholarships to international students to pursue various post-graduate programmes. The centre targets to enrol 82 post-graduate students in three years.

ACENUB was established to strengthen agri-food system skills development in Africa and boost linkages with local, regional and international universities, agriculture knowledge institutions and agro-based industry.





# An Educative Exchange Visit to France with CREATES-FNS

The African Centre for Research, Agriculture Advancement, and Teaching Excellence in Food and Nutrition Excellence (CREATES-FNS) organised a transformative two-week exchange visit to France, sponsored by the Innovesity Project through the French Embassy in Tanzania.

This initiative aimed to immerse two students and one staff member from the Nelson Mandela African Institution of Science and Technology (NM-AIST) into the dynamic French innovation ecosystem.

The aim was to understand the mechanisms and structures that have turned France into an innovation and start-up hub, with the aim of establishing potential partnerships and applying these insights in the African academic context.

They engaged in discussions with academic and industry experts, start-up founders, and venture capitalists, delving into the intricacies of start-up incubation, investment strategies, and the role of research and

development in driving innovation. Visits to innovative hubs, technology parks, and research institutions highlighted the collaborative relationship between academia, industry, and start-ups in France.

A pivotal aspect of the exchange was the interaction with successful African entrepreneurs who had established start-ups in France, providing inspiration and motivation for the NM-AIST team. The visit catalyzed potential partnerships between African academic institutions and their French counterparts.

Upon their return, the NM-AIST participants are eager to share their newfound knowledge and experiences, advocating for

the implementation of strategies that align with the vibrant French innovation ecosystem. This exchange has reignited NM-AIST's commitment to fostering innovation, academic start-ups, and a culture of entrepreneurship in Tanzania and beyond.

CREATES-FNS's strategic initiative in facilitating this exchange represents the objectives of the Africa Centers of Excellence project to promote regional research and teaching collaboration locally, regionally and internationally to generate greater impact, enhance the impact of the ACE on development and increase its relevance in education and research in Africa.





# CREATES in Tilapia Cage Fish Farming collaboration to enhance nutrition

In an effort to enhance food and nutrition security in Tanzania, the Center for Research, Agricultural Advancement, Training, and Entrepreneurship for Food Nutrition and Security (CREATES-FNS) at the Nelson Mandela African Institution of Science and Technology (NM-AIST) has embarked on a collaborative project with key stakeholders to establish a Tilapia Cage fish farming initiative in Lake Victoria.

**T**his initiative seeks to address nutritional insecurity, unemployment, and inadequate income, particularly in the Kagera region and across Tanzania.

The Tilapia Cage fish farming initiative is led by NM-AIST in collaboration with the Ministry of Livestock and Fisheries, Tanzania Agricultural Catalytic Trust, and Kagera Region Administration.

Tanzania recognizes the significance of fish as a superfood with the potential to improve

both nutritional well-being and the economic status of its citizens, especially those living in fishing regions. Despite having an estimated fisheries potential of 750 metric tonnes, only 450 metric tonnes are currently harvested, and aquaculture contributes to just 3% of the total fish supply. Several challenges hinder successful aquaculture, including the lack of viable aquaculture species, quality fingerlings, suitable feeds, effective farming strategies, supportive policies, and investment capital.

To tackle these challenges, the initiative has laid out a holistic approach, focusing on the following strategies:

- Demand-Driven Research to develop quality fish feeds, superior fingerlings, disease management, and effective farm management practices, tailored to industry demands.
- Standardization and certification for quality standards and certifications for local consumption and export markets, enhancing marketability and consumer confidence.
- Enhanced availability and commercialization to ensure scalable production of high-quality local fish feeds and fingerlings to promote the growth





# CREATES AND UNDP COLLABORATE IN RESEARCH ON TECHNOLOGY TRANSFER

The Nelson Mandela African Institution of Science and Technology (NM-AIST) has entered into a strategic partnership with the United Nations Development Program (UNDP) in Tanzania to conduct a vital study on assessing the challenges and opportunities for Technology Transfer and Research Commercialization (TTC) within Higher Learning and Research and Development (R&D) Institutions in Tanzania. This collaborative effort was initiated by the Centre for Research, Agriculture Advancement and Teaching Excellence in Food and Nutrition Excellence (CREATES-FNS) and its incubation subsidiary, the Data-Driven Incubation Centre Project (DDI), mirroring the UNDP Tanzania Funguo Project's goals.

The study involved 21 Tanzanian

Higher Learning Institutions (HLIs) and Research and Development institutions. These explored the current landscape and prospects related to technology transfer and the commercialization of research outputs and innovations. The findings of this study shed light on ways to improve technology transfer and research commercialization within these institutions, emphasizing the need for increased financing and investment, strengthened partnerships with the private sector and industries, a more robust legal and regulatory framework, guidance on intellectual property rights, effective management and coordination, demand-driven research, enhanced visibility of research and innovation outcomes, and a skilled workforce.

of cage fish farming.

- Facilitate financing to attract investment capital for stakeholders in the cage fish farming value chain.
- Advocate for a conducive regulatory environment that supports businesses in cage fish farming.
- Capacity building to skill personnel and extension workers to support cage fish farming sustainably.

By addressing systemic challenges and implementing targeted strategies, this initiative aims to create a thriving aquaculture industry that fulfils both nutritional needs and economic prosperity for the nation.





# Highlights from the Oil and Gas Symposium at Eduardo Mondlane University

The Centre for Studies in Oil and Gas Engineering and Technology at Eduardo Mondlane University hosted its 2nd Oil and Gas Symposium from September 20th to 21st, 2023.

This event served as a platform for academics, researchers, sector professionals and students to share their research findings and the latest technological advancements in geosciences, engineering, technology, economics, and other oil and gas-related areas, with a particular focus on climate change and environmental concerns.

The symposium, operating under the theme “The contribution of research and technological innovation in the oil and gas industry

to sustainable development,” was an integral part of Eduardo Mondlane University’s 12th Scientific Conference in 2023.

The primary thematic areas at the symposium included:

- Strategies for sustainable development in oil and gas production and processing.
- Innovations in oil and gas engineering and technology in the context of climate change.
- Research in geosciences and the environmental aspects of the oil

and gas industry.

- (iv) Human resource development for the oil and gas sector.

This biennial event featured two panels and presented a total of 22 scientific works. The main session was hosted by Prof. Humberto Gracher Riella, from the Federal University of Santa Catarina, a renowned Brazilian higher education institution.

Luís Hélder, Assistant Professor and Director of CS-OGET, noted, “The event offers a unique opportunity to share research findings in the field of oil and gas and related areas. The involvement of oil and gas companies enhances the discussions and contributes significantly to the advancement of technological knowledge in the sector. Furthermore,



# CONFERÊNCIA CIENTÍFICA 2023

Extensão e Inovação no Contexto das Mudanças Climáticas

20 - 22 SETEMBRO 2023



it allows the academic community to become familiar with the cutting-edge technological tools developed by these companies.”

The symposium boasted an estimated 124 participants, including the Vice Chancellor of Eduardo Mondlane University, Prof. Manuel Guilherme Júnior, Deputy Vice Chancellor (academic), Prof. Amália Uamusse and government representatives. Participants lauded the event for creating a space to exchange research findings and technical studies developed by academia, the private sector, and public companies in the realm of hydrocarbon research and production processes.

<http://www.csouetuem.mz/>

## ACALISE'S INNOVATION & RESEARCH PLATFORM EMPOWERING FARMERS AND STUDENTS

The Farmer-Student Innovation Research and Exchange Platform made its debut during the 2nd Edition of the CSO-Farmer-Student Exchange event on October 20, 2023, at Uganda Martyrs University. This initiative, led by the African Centre of Excellence in Agroecology and Livelihood Systems (ACALISE) in collaboration with the Advocacy Coalition for Sustainable Agriculture (ACSA) and Uganda Organic Certification Company Limited (UgoCert), is aimed at bridging the gap between student research and the farming community.

The platform provides a space for farmer innovators and research students to share their projects, offering solutions to the challenges faced by farmers. This initiative brings together various stakeholders, including Civil Society Organizations (CSOs), academia, the private sector, and government agencies, with the goal of promoting sustainable agriculture, agricultural market development, environmental conservation, and research and advocacy.

The primary objective is to disseminate organic innovations and research, contribute to the implementation of the National Organic Agriculture Policy (NOAP) 2019, and generate recommendations for further research. It also facilitates the sharing of experiences among organic agriculture partners and provides guidance to innovators on aligning certification services with academic research institutions.

The exchange platform's

achievements are evident, as students document traditional farming practices, establish scientific facts about these practices, and create scientific formulas. This has cultivated an innovative culture among smallholder farmers, leading to increased production and improved livelihoods while adhering to agroecological principles.

Moreover, the platform has popularized academic innovations and best practices, which farmers replicate to enhance their productivity. Students have the opportunity to identify challenges faced by different communities, informing their research topics. Furthermore, the platform educates farmers about the policies, processes, and guidelines for registering and certifying their products and innovations. This collaborative effort empowers both farmers and students, fostering positive change in Uganda's agricultural landscape.

<https://acalise-umu.ac.ug/>

# CENTER FOR OIL AND GAS CONDUCTS PIONEERING LOCAL CONTENT TRAINING

The Centre for Studies in Oil and Gas Engineering and Technology (CS-OGET) at Eduardo Mondlane University successfully conducted its first-ever five-day training program focused on local content in the oil and gas industry from October 9th to October 13th, 2023.

The objectives of this training were two-fold: to enhance the capabilities of professionals and projects within the regional oil and gas sector and to strengthen the concept of Local Content within the industry. This training aimed to enhance the competitiveness of local suppliers throughout the entire production chain, enabling them to fully leverage the opportunities emerging in this sector.

The course was facilitated by Prof. Elmar Mourão, a distinguished Local Content specialist from Fundação Getúlio Vargas in Rio de Janeiro, Brazil. The program covered critical areas, including industry dynamics, the global oil and gas market, local content policies, procurement strategies, methods for calculating local content, and the benefits of faithfully implementing such policies.

Luís Hélder, the Assistant Professor and Director of CS-OGET, emphasized the significance of not only fortifying the industry but also supporting the Mozambican government in crafting policies to mitigate the negative effects of global mismanagement of oil resources. He emphasized the need for an in-depth understanding of Local Content to enable

Mozambique and the region to make the most of the opportunities presented by its oil resources, stating, “We need to have comprehensive knowledge about Local Content to take full advantage of the opportunities that our oil resources offer.”

Participants in the program expressed their gratitude and recognized the value of sharing knowledge with professionals already deeply involved in the field of Local Content. Américo Belane, an employee at the Ministry of Mineral Resources and Energy, stressed the importance of learning from Brazil’s experiences, where mineral resource exploration is well established. Ivete Mafundza, a lecturer at Eduardo Mondlane University, saw this as a unique opportunity to gain insights from the experiences of other countries in resource exploration.

The course catered to a diverse group, including professionals from the oil sector, academics, researchers, government officials, policymakers, and media professionals. The course attracted a total of 55 participants, including participants from Rwanda and South Sudan.

<https://www.csoget.uem.mz/>









# STUDENT INVENTS SWAHILI CHATBOT TO SUPPORT FARMERS

Theofrida Maginga, a PhD candidate at the University of Rwanda's African Center of Excellence in Internet of Things (ACEIoT) is in advanced stages of developing "Mkulima GPT," a Swahili chatbot powered by ChatGPT. This innovative project aims to assist smallholder farmers in promptly detecting crop diseases, catering to individuals with limited literacy and resources.

**M**kulima GPT combines Artificial Intelligence (AI) and Internet of Things (IoT) technologies to provide culturally-sensitive agricultural information. Funded by the Bill and Melinda Gates Foundation, this initiative is a collaborative effort with Dr. Jimmy Nsenga, an affiliated honorary lecturer at ACEIoT.





The technology enables smallholder farmers to easily identify crop diseases, such as Northern Leaf Bright, by integrating AI and IoT, utilizing non-invasive sensors to monitor early disease indicators like volatile organic compounds (VOCs), ultrasound movement, and soil nutrient uptake.

Maginga likens this platform to a virtual extension officer, saying, "We are bringing a virtual extension officer with the assistance of the Chat GPT model. The farmer can receive real-time advice and communicate with the technology in the local language."

Currently in the testing phase, the project encourages potential users to try it and provide feedback for

improvements. It boasts a website and a dedicated WhatsApp number for farmers to send queries in Swahili or English, whether in text or audio. The platform provides information on farm preparation, maize disease management, post-harvest procedures, and more.

With the funding, the researchers are collecting questions and answers from farmers, which will be stored in a database and reproduced as if farmers were interacting with extension officers. Maginga explained, "We have the IoT part, but instead of forcing farmers to report to extension officers when they detect diseases, the technology will do that, minimizing human interaction."

In addition to expanding the

platform to cover more crops beyond maize, Maginga stresses the importance of using ChatGPT and other AI-based solutions in local languages across various sectors. She envisions Mkulima GPT to be extended to more African languages, emphasizing the importance of farmers interacting in their own local languages.

The platform is expected to launch in December 2023 after the final testing processes are completed. In the meantime, the developers invite experts in agriculture and artificial intelligence to review their work and provide insights to ensure readiness for use by smallholder farmers.

<https://aceiot.ur.ac.rw/>







## ACALISE Graduates Its First Batch of PhD Recipients

**D**uring Uganda Martyrs University's 30th-anniversary celebration and 29th graduation ceremony on October 18, 2023, the first group of PhD pioneers successfully graduated from the African Centre of Excellence in Agroecology and Livelihood Systems (ACALISE).

This inaugural cohort included three graduates, namely:

Dr. Freddie Kabango, who conducted research on "Optimizing Low Levels of Lime and Manure for Bean Production in the Ferralsol of Lake Victoria Crescent."

Dr. Gerald Kamoga, an expert

in farming and agribusiness, who explored "Greenhouse Gas Emissions Arising from Smallholder Farmer Waste Management Practices in Uganda."

Dr. Abdoulaye Fofana Fall, hailing from Senegal, delved into "The Effects of Inorganic Fertilizer Combined with Indigenous Arbuscular Mycorrhizal Fungi Isolates on Soil Chemical Properties, Maize Growth, and Yield."

All three graduates earned their PhDs in Agroecology and Food Systems from Uganda Martyrs University.

<https://acalise-umu.ac.ug/>





# UNIVERSITY OF RWANDA HOSTS 8TH DATA SCIENCE AFRICA CONFERENCE

**T**hemed 'Harnessing Data Science for Africa's Socio-Economic Development,' the conference featured a summer school focused on machine learning and artificial intelligence, as well as paper presentations and interactive panel discussions on the work being done within the African data science community.

The Vice Chancellor of the University of Rwanda, Didas Kayihura Muganga, noted, "incorporating data science enables us to identify the issues and challenges at hand, and the scientists will assist us in developing methodologies to address and resolve these matters effectively. The researchers will

The University of Rwanda's Africa Centre of Excellence in Data Science hosted the eighth Data Science Africa (DSA) Conference in May 2023, bringing together researchers in data science to discuss issues in the field and its potential for socio-economic development.

present their findings, and we will assess the feasibility of implementing these interventions, here or in other countries," he said.


He also noted the growing application of data science across sectors, which enables institutions to assess their progress based on data and make informed decisions to formulate better plans for the future.

Ciira Maina, Board Chair for Data

Science Africa, said there is a growing recognition of the importance of expertise in data science across the continent. He highlighted potential opportunities in sectors such as agriculture, where data science can enhance food production, as well as in finance, insurance, and health.

<https://www.aceds.ur.ac.rw/>





# ACE II BOOSTED FEMALE ENROLMENT RATES

The Eastern and Southern Africa Higher Education Centers of Excellence Project was launched to support higher skills development in science, technology, engineering and mathematics to address regional development needs. The project placed a special emphasis on inclusion of women.

Female enrolment rates—as a percent of total enrolment—were particularly low: less than one percent in Malawi and four percent in Ethiopia. Furthermore, existing policies, institutional structures, and academic customs have posed formidable barriers to the participation of women in teaching, research, and administrative roles.

The ACE II project incorporated gender-specific indicators, such as tracking the numbers of female students, female faculty members, and student exchange programs, to ensure

a focus on promoting female inclusion. ACEs were incentivized to earn more money if they enrolled women.

Through the ACE Scholarship Program, the World Bank and IUCEA offered fully funded Masters scholarships to young women to pursue Master's and PhD programs in STEM outside their native country.

According to their proposals, over the course of five years, these ACEs collectively aimed to enrol more than 1,000 women in Masters and PhD programs. Notably, between 2016 and 2023 the annual average enrolment





increased from 214 at baseline to 391 female students – an 82.6% increase. The cumulative number of enrolled female students stands at 2,558 and more than doubled the target.

The higher education played a pivotal role in enhancing their knowledge and skills and the scores of female graduates are now productively engaged in various priority sectors in their respective scientific fields across the ESA region and beyond.

Below is the story of Ms. Catherine Namuga.

**NAME:** CATHERINE NAMUGA  
**COURSE:** PHD IN MECHANICAL ENGINEERING (BIOMATERIALS),  
 MAKERERE UNIVERSITY  
**RESEARCH TOPIC:** DEVELOPMENT OF A BIOACTIVE GAUZE DRESSING  
 USING HERBLOADED NANOPARTICLES TO FACILITATE WOUND HEALING

### SUMMARY

The research about development of a wound dressing that can deliver herbal drugs directly into the wound to help prevent and treat wound infections. Infections lead to prolonged healing and sometimes lead to surgery. Sadly, bacteria have become more resistant to most synthetic antibiotics.

Gauze is the most affordable and utilized wound dressing in developing countries like Uganda. However, it is associated with high infection rates. Due to its non-occlusive nature, bacteria can penetrate up to 64 layers of gauze. Loading the gauze dressing with antimicrobial agents could improve its functionality and prevent wound infections.

With the high rate of bacterial resistance, herbal medicine has become a potential solution to antibiotic resistance because they contain a wide range of bioactive compounds with a synergistic effect against bacteria. However, their poor solubility and bioavailability require them to be taken in high doses limiting their use. Therefore, the research focuses on incorporating selected herbal extracts into polymeric nanocarriers to improve their efficacy, solubility, and bioavailability. The nanoparticles will be then incorporated into the dressing and tested for efficacy against several bacterial strains as well as on wounds using animal wound models.

The expected result of this research is to produce a dressing that releases the herbal extract into the wound in a sustainable manner. This will result in faster

wound healing, minimize doses, prevent patient non-compliance to oral drugs, and the dressing change frequency.

The study contributes to SDG3 which aims to prevent needless suffering from preventable diseases and premature death by focusing on key targets that boost the health of a country's overall population.

### IMPACT

The study is meant to add value to herbal extracts which are used all over the country and the continent, especially in village communities. The technology can be applied to every other herbal drug meaning that it will create market for those that deal with herbal drugs. Additionally, having an improved bioactive nano herb-loaded gauze will improve infection control and accelerate healing reducing patient hospitalization time and healthcare costs, minimize the frequency of dressing changes, reduce trauma on removal, and save patients the burden of taking antibiotics for a long time.

### INNOVATION PRODUCT:

An improved bioactive gauze dressing that delivers herbal drugs into the wound. Innovation not yet registered.

### PLANS:

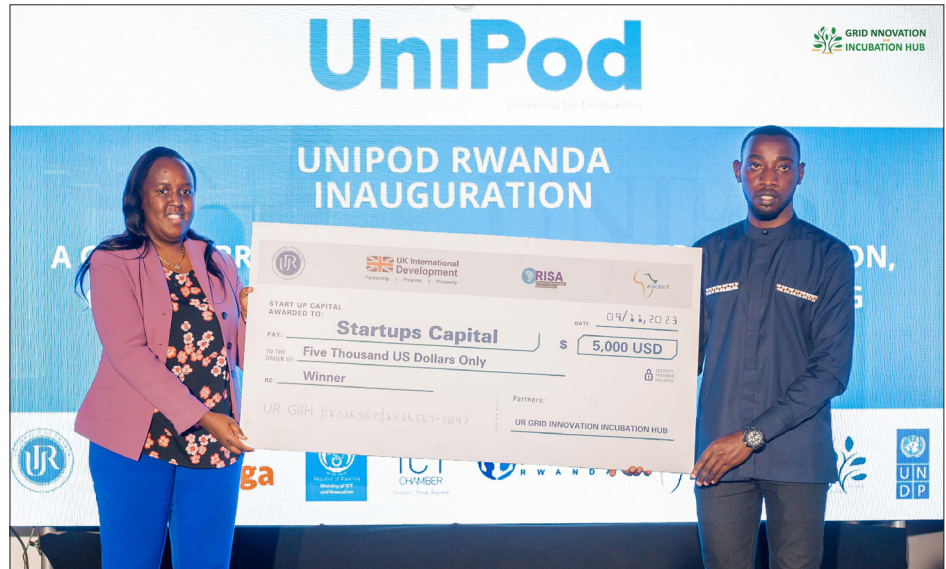
The plans are to further improve the product to make it scalable for commercial use as well as register a patent. Also to engage in other nano-formulations that contain herbal drugs.

Catherine's research is funded by the Center for Materials, Product Development and Nanotechnology (MAPRONANO) at Makerere University.



# UNIPOD launch to ignite innovation and student-led solutions

On Friday, November 10, Gaspard Twagirayezu, the Minister of Education, Rwanda, officially launched the University Innovation Pod (UNIPOD). This initiative, funded by the United Nations Development Programme (UNDP), is designed to foster innovation, encourage interdisciplinary research, and cultivate the future generation of innovators and entrepreneurs within the University.



Most outstanding innovations were rewarded.

The launch took place on the sidelines of the University of Rwanda Innovation Week 2023 where young innovators showcased creative solutions addressing various societal challenges. A total of 18 exceptional projects were acknowledged and received awards. Specifically, eight projects centering on AI and the Internet of Things were granted Rwf5 million each, while the remaining projects, spanning different sectors, were awarded Rwf5 million to Rwf1 million.

Hon. Twagirayezu said, "Investing in our people is investing in the future of our nation. This maker-space bridges the gap between our schools and the community."

He added, "The country's ambition is to become a model innovative society, and that journey starts now. People who make this journey a reality are the students," he said, urging them to connect their visions to society's problems. "You should not count yourselves out of what is happening in this world," he added.

Marie Ritha Umutoni, a student innovator, received an award for her start-up, 'Ibaba Intelligence Solutions,' which created a cost-effective home security system. The system utilizes affordable, non-intrusive components to detect motion for humans, animals, and vegetation. Upon detection, it can activate actions like sounding alarms or sending SMS or call alerts to notify

owners of potential intruders.

Shauri Kalibatha Jonathan has developed 'Re-Banatex' which recycles banana trunks into garments, bags, and hair extensions.

Maxwell Gomera, the UNDP Rwanda Representative, noted that for far too long Africa has been peripheral to the knowledge economy. "Not because we are not contributing, but because we have allowed ourselves to be placed where we are," he said. He said universities in Africa have considered their core business as only teaching and research. "However," he said, "this must change today and it is possible as students showed their potential that they can do even more."



## Disbursement Rates as at July 2023

COUNTRY	BUDGET ALLOCATION	APPROVED FOR DISBURSEMENT	APPROVED DISBURSED
UGANDA	24,000,000	23,126,000	96%
RWANDA	20,000,000	19,098,806	95%
KENYA	18,000,000	16,913,000	94%
ZAMBIA	12,000,000	10,765,000	90%
MALAWI	12,000,000	10,555,724	88%
TANZANIA	24,000,000	21,174,874	88%
ETHIOPIA	24,000,000	20,954,672	87%
MOZAMBIQUE	6,000,000	3,310,499	55%
<b>TOTAL</b>	<b>140,000,000</b>	<b>125,898,575</b>	<b>90%</b>

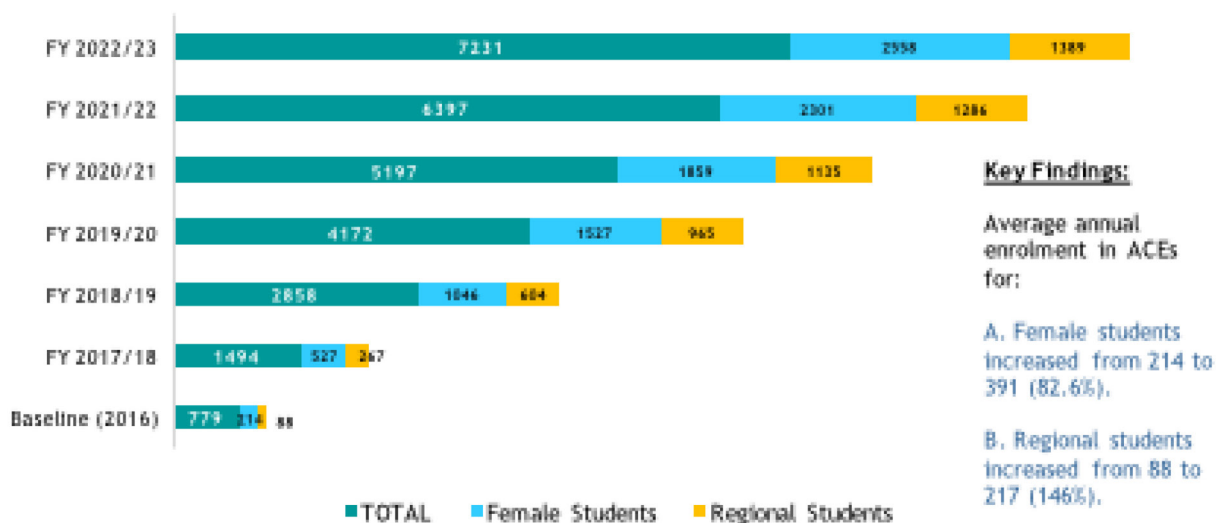


# ACE II

Eastern and Southern Africa  
Higher Education Centers of Excellence Project



Average annual enrolment in ACEs (ACE II) has grown by 38%, from 779 at baseline (2016) to 1,075 by 2023.



## ACE II Increased Student Enrolment

Africa Centers of Excellence enrolled students on a large scale to support the region's demand for specialized human capital in the regional priority areas of agriculture, applied statistics, education, health, and industry

[www.ace2.iucea.org](http://www.ace2.iucea.org)

[X@Ace2Africa](https://twitter.com/Ace2Africa)

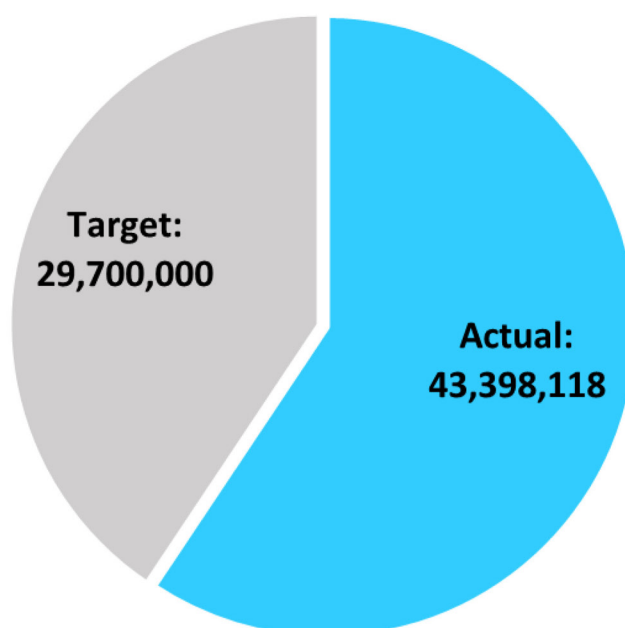


# ACE II

Eastern and Southern Africa  
Higher Education Centers of Excellence Project



## External Revenue Generated (\$)



## Revenue Generation Strengthened

Collectively, the ACEs generated \$43 million, surpassing their \$30 million target, thus developed the skills to compete for research and other external funding opportunities to finance their development needs

[www.ace2.iucea.org](http://www.ace2.iucea.org)

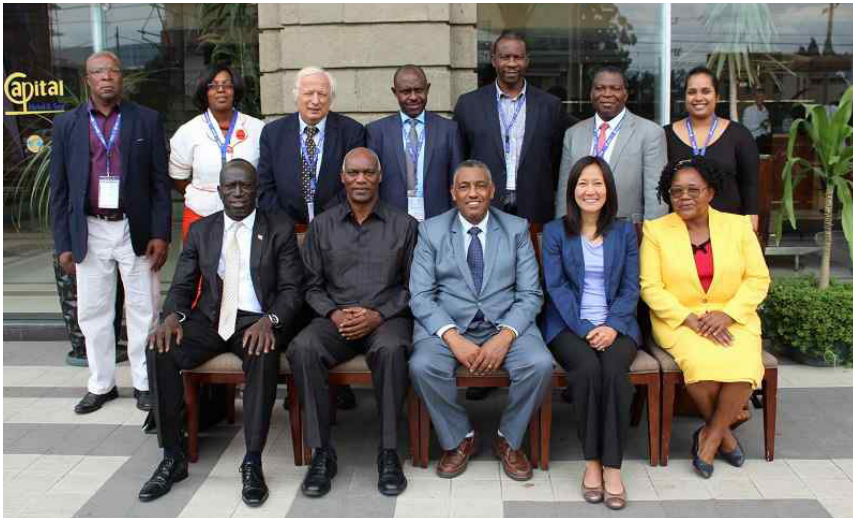
[X@Ace2Africa](https://twitter.com/Ace2Africa)



## ACE II Project through the Years









### **ACE II Project**

Inter-University Council for East Africa

🏠 Regional Facilitation Unit  
Africa Centers of Excellence,  
Kyambogo, Kampala  
P.O.BOX 7110 Kyambogo  
Kampala, Uganda

✉️ [ace2rfu@iucea.org](mailto:ace2rfu@iucea.org)

🌐 [ace2.iucea.org](http://ace2.iucea.org)

📱 @Ace2Africa