



**Kenyatta
University**



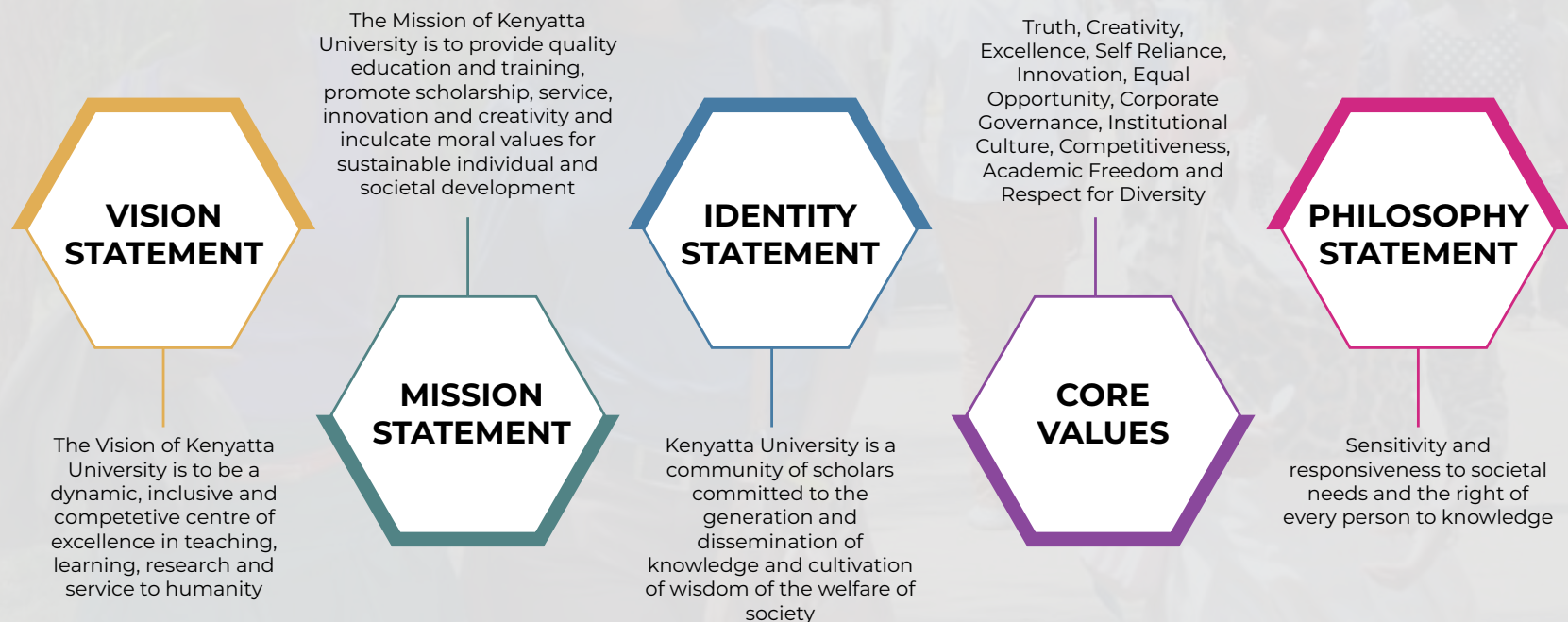
Research and Innovation News

A Publication from the Division of Research, Innovation and Outreach

Issue No. 7

December 2020

UNIVERSITY FUNDAMENTAL STATEMENTS



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Editorial

Editorial Committee:

Prof. Vincent Onywera; PhD, ISAK 2

Ms. Violet S. Tindi

Ms. Sylvia Anzagi

Ms. Martha Wainaina

Mr. Laban Migudi

Ms. Pamela Mbae

Mrs. Emily Cheruiyot

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Mr. David Werimo

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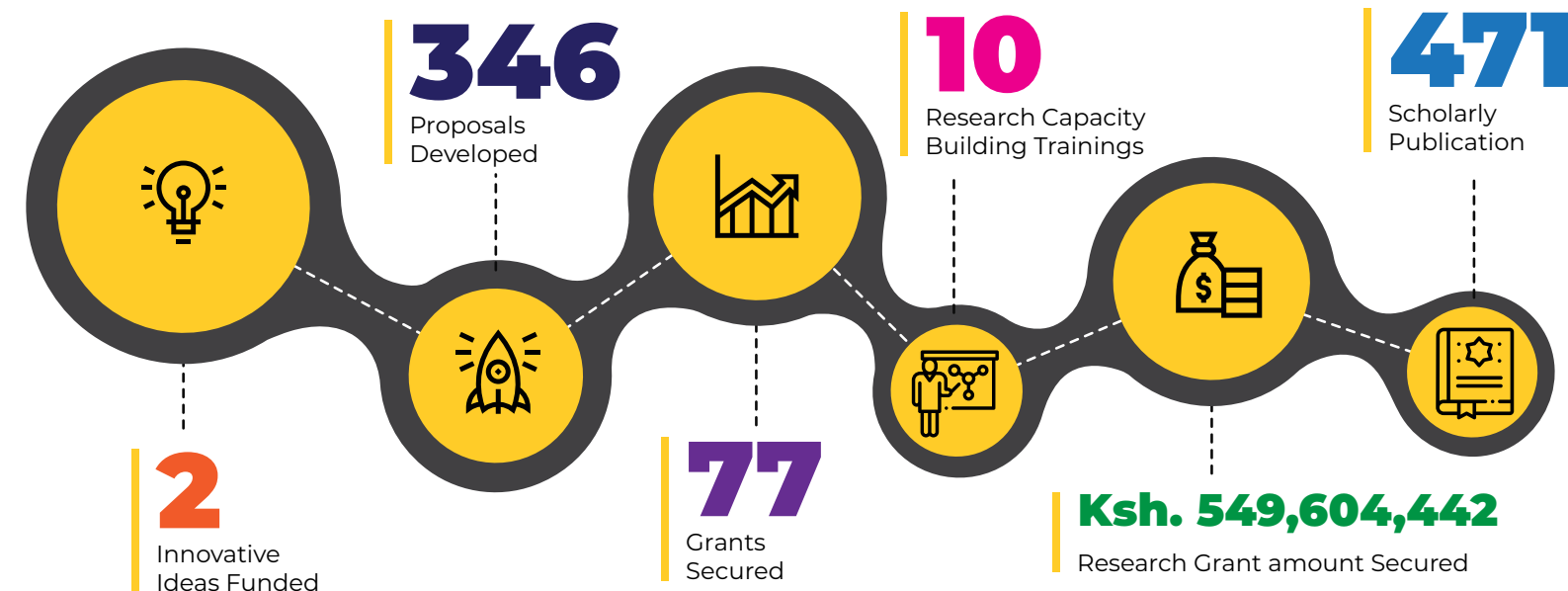
We welcome you to this 7th issue of The Research and Innovation News! This is a signature publication from the Division of Research, Innovation and Outreach. Despite the challenges caused by the covid-19 pandemic, Kenyatta University faculty, staff and students have remained resilient and committed in pursuing the core mandate of the university - **teaching, learning, research and community service**. In this publication, we highlight notable achievements and efforts by the University Management Board, Schools, Departments, Directorates, members of faculty, staff and students as well as key stakeholders in significantly contributing to the University's Research and Innovation agenda despite the challenges of covid-19. This publication covers a wide range of topical stories and news including but not limited to funded research and development grants, dissemination of research findings, community engagements, incubations and innovations as well as visiting scholars. We congratulate and celebrate all of you for your support, efforts and achievements which are true to the aspirations of Kenyatta University.

We wish you a **healthy and peaceful Merry Christmas and Prosperous New Year 2021.**



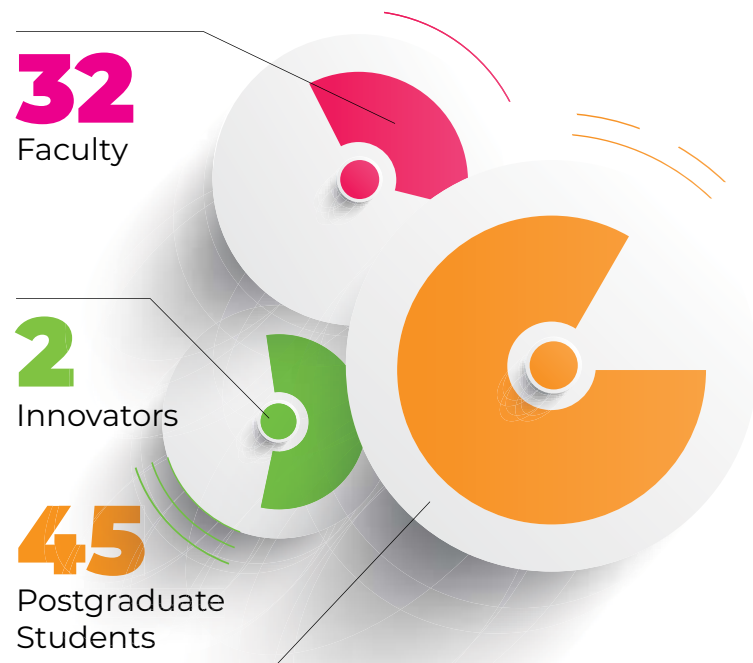
Prof. Vincent Onywera, PhD, ISAK 2
Registrar Research, Innovation and Outreach and Editor-in-Chief

Performance at a Glance



Performance at a Glance

Grants **Awarded**



Startups Admitted >> **12**

Startups Commercialized >> **6**

Patents Applications Filed >> **6**

Research Dissemination & Outreach Activities >> **10**

International and National Conference/ Workshop Attended by Faculty >> **284**

1

INNOVATION NEWS

Students' led COVID-19 Innovations



KU student develops **test kit prototype for COVID-19**

Mr. Simon Karuga Ndirangu showcasing the swabs developed

Mr. Simon Karuga Ndirangu a student in the Department of Biochemistry, Microbiology and Biotechnology has developed a prototype kit for diagnosing respiratory diseases focusing on Covid-19. With the support of his supervisors in the department, Mr. Ndirangu has developed improved prototypes for swabs that can be used to collect samples the innovation seeks to help improve the efficiency of the testing process which is limited by accessibility to testing kits. The project is timely and important for Kenyatta University and the Country and is in-line with Kenya's Big 4 Agenda especially the one on universal health coverage. The innovation has locally been patented with Kenya Industrial Property Institute, Patent number KE/P/2020/3654.

Features of new swab

- **Easy to use**
- **Material used offers more flexibility**
- **Has a weakness point for cutting - eliminates the need to touch the swab**
- **Cost effective thus ideal for mass production**
- **Method of production is from 3D-printing**

The production level is between 500-1000 swabs per day.



A sample of the swabs

TIBA Vent Ventilators

Fifteen Kenyatta University students with the support of faculty and technicians have developed ventilators to aid in the treatment of Covid19 patients. The ventilator which is developed from locally and readily available material takes charge of the patient's lungs while enabling the patient to breath well without lung pressure.

It has an air tank or air bag to store oxygen, a mixer and a compressor that develops the required pressure and tidal volume. The ventilator has two valves: inhalation and exhalation that control the flow of air in and out of the lungs. It has the capacity filter and humidifies the air before being fed into the patient.

The machine self-calibrates its sensors and has a friendly graphical user interface. The technology which has been patented with the Kenya Industrial Property Institute KE/U/2020/1401 can be monitored remotely.

Additionally, the technology has earned the team of innovators the coveted UN PERSON OF THE YEAR AWARD 2020 for their effort in responding to COVID -19 pandemic.



A demonstration of the ventilator in use.



The development of the prototype was financed by Kenyatta University, the Kenya National Innovation Agency, and Betika.com amongst others.



The team of 15 students together with the VC Prof. P. K. Wainaina (middle) and Dean, School of Engineering and Technology Dr. Shadrack Mambo at the UN office pose for a photo with their UN PERSON OF THE YEAR AWARD 2020.

Apollo an “Intelligent barrier system”



The team of innovators led by Fidel Makatia, demonstrates the use of intelligent barrier system to the Vice Chancellor Prof. Paul Wainaina and other guests

The system measures the user's body temperature, while detects whether the user has a face mask on and properly worn, giving people access based on the parameters.

The system is also used as a security system. It has an incorporated face identity technology that allows access by only registered users using their facial data or allowing access using an assigned Radio Frequency Identification tag (RFID) or organization identification card.

Being an intelligent barrier system, Apollo finds its applications in many fields. This includes entry barriers in institutions, banking halls, malls and any other restricted entry access areas. This helps in enforcing the COVID-19 measures by ensuring that all people accessing the premise adhere to wearing their masks and have their body temperature within the required limits. If any of these conditions is not met then access is denied and an alarm is raised for the relevant authorities to take action.

Five students from the school of Engineering and Technology led by Fidel Makatia have developed a first of its kind Intelligent Barrier system for allowing people access to premises. The product is ready for the market and has been patented with the Kenya Industrial Property Institute. Patent number KE/P/2020/3722.



The smart barrier during the design and development stage



Cynthia Thuo, one of the team members demonstrating how the machine is used.

Enthusiastic KU engineering club holds **mega Innovation and Entrepreneurship Expo**

Chandaria Incubation Centre in collaboration with School of Engineering, Engineering Students Association (ESA) organized a Mega Innovation and Entrepreneurship Expo (MIEE) which saw over thirty engineering projects developed by the students exhibited. The expo which is meant to encourage students towards innovation and entrepreneurship in their class projects is part of the university's initiative in inculcating innovation and entrepreneurship towards teaching methodologies in a bid to commercialization of research projects. This initiative is also a way of harvesting innovative business ideas from the schools for support towards commercialization at the Chandaria Incubation Centre.

The three top projects Table Salt Fueled Power Generator, by Leakey Kebaso, Secure Eco Friendly housing developed by Issac Ngatia, Eva Mugweru, Gregory Osembe, Eric Ouma and Hostel Security developed by Eric Ouma and Elijah Kiplimo were each awarded each A cash prize and a trophy. A total of eleven projects with potential for development towards product and commercialization were exhibited as developed both in groups and individual capacities.



Prof. Frederick Gravenir (DVC, RIO) and Leakey Kebaso winner of the MEGA EXPO, on his project Table Salt Fueled Power Generator.

KU Don develops **SGBV** **Reporting** **App**



Prof. Grace Wamue-Ngare showcasing the Kenyatta University SGBV Reporting App.

The number of students both male and female that are sexually harassed in institutions of higher learning here in Kenya are on the rise. This problem is further exacerbated by non-prosecution of incidents of sexual and gender-based violence (SGBV), as cases are often dropped because of lack of evidence or are simply not reported due to a fear that survivors will not be taken seriously

Prof. Grace Wamue-Ngare of the Department of Sociology, Gender and Development decided to work out a solution to this growing problem, through the ACU Gender Grant Prof. Wamue-Ngare developed a mobile App makes it easy for students and staff at who have experienced SGBV to anonymously report incidents of sexual harassment, abuse and gender discrimination. The data is then submitted to the KU Centre for Gender Equity and Empowerment for investigation. Users can upload evidence, view emergency numbers to contact the police and access a counselling centre, all via the fully secure Android app.

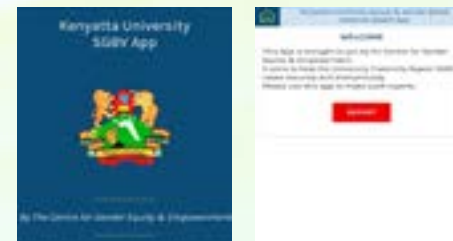
Prof. Wamue-Ngare observed that the commonest form of SGBV in Kenyan universities is sexual harassment among staff and students, often surrounded by gender power dynamics. The app brings to the fore the usual culture of silence, fear of intimidation and general apathy of uncompleted cases, which quite often lack factual evidence. Additionally, it strengthens reporting mechanisms and evidence collection which should deter possible

perpetrators, Professor Wamue-Ngare's hope that the app will break the culture of silence that prevents people from coming forward. The result: a safer campus for all. The app will also function as a communications tool allowing the Centre for Gender Equality to communicate important news. Messages about SGBV and gender issues, developed in collaboration with Women Education Researchers of Kenya (WERK), will also be featured.

The app has attracted a lot of attention from other universities administration and there is hope that this will be adopted in all institutions around the country

'To have delivered this to the university gives me a lot of fulfilment because I'm passionate about addressing SGBV. I am a survivor of it, and I would hate anybody to go through what I went through. I believe if we could transform the life of only one girl or one boy in the university, then we have done something.'

The Kenyatta University SGBV Reporting App is available to download on Android. The App was launched on 21 June 2020 and has had 50,000+ downloads.



2

RESEARCH NEWS

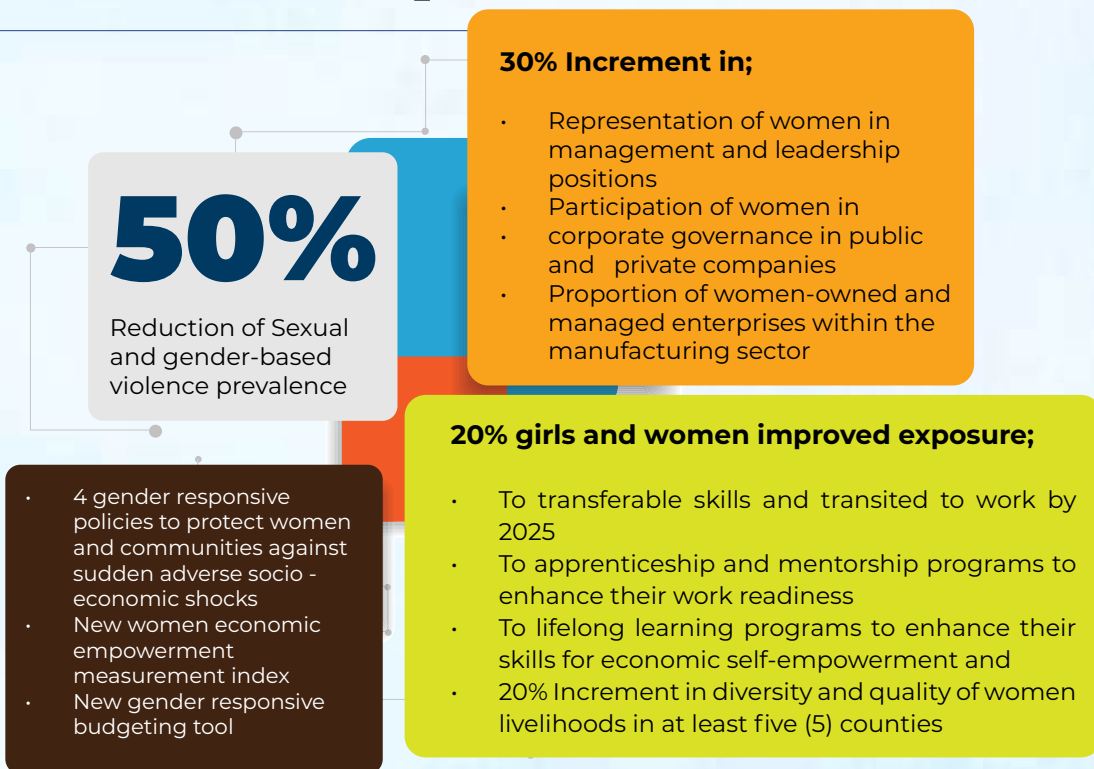


a. Research & development grants

Kenyatta University receives grant to establish a Women Economic Empowerment Hub

Kenyatta University has received development grant of USD. 400million from the Bill and Melinda Gates Foundation. The grant is meant to support the establishment of a Women Economic Empowerment (KU-WEE) Hub at Kenyatta University. The KU-WEE Hub Project aims to ensure that various stakeholders such as government ministries and departments, county governments, policy leaders (legislators and policy makers) non-governmental organizations and agencies as well as donors utilize empirical evidence to implement and shape policies, programs, interventions and advocacy efforts related to supporting women's economic empowerment (WEE) in Kenya.

The primary 11 outcomes to be achieved by the year 2025 include:



The project activities will include:

- Analytical studies** in three thematic areas:
 - The role of Women in the Public and Private Sectors
 - Skilling and Mentoring
 - Violence, Crisis and Women's Work
- Impact evaluation** - to generate evidence on causal relationships and the effectiveness of a promising intervention to improve WEE.
- Stakeholder engagement** - Involving policymakers, citizens as well as civil society groups so that a range of informed stakeholder groups can come together to advocate for evidence-based policy making.
- Capacity building** - To ensure that strong institutions and networks emerge and are available to partner with governments and others on evidence generation for WEE.
- Advocacy and Communications** - Trainings on: packaging of research evidence for media; effective policy communications and advocacy; modes of communicating evidence effectively; how evidence needs to be packaged in order to be most impactful.

The Key Hub personnel



Prof. Caroline Thoruwa

The Hub Board chairperson



Prof. Judith Waudu

The Hub Leader



Prof. Grace Wamue-Ngare

Advocacy and Policy Engagement Expert



Prof. Germano Mwabu

Research Associate (Quality Control and Partnerships)



Prof. Nelson H. W. Wawire

Research Coordinator



Mr. James O. Onditi

Administrative and Finance Manager



Prof. Simon Onywere

Research Associate (Fieldwork Coordinator)



Mathematical modelling for disease control

Dr. Winifred Mutuku, of the Department of Mathematics and Actuarial Science, was awarded the Genomics and Modelling to control of virus pathogens (GeMVi) Research Fellowship for a project titled, **“Estimating the Distribution of New HIV Infections in Kenya through the Modes of Transmission”**. Dr. Mutuku won £17,280.

The award is part of the continued capacity building programme by the KEMRI-Wellcome Trust Research Programme. As part of the award, she will undergo further training and capacity building in mathematical modelling of disease control at Warwick University,

UK.

The project is in line with the United Nations Strategic Development Goal (SDG) 3, which advocates for good health and well-being through reduction of global maternal mortality rate, end preventable deaths of new-borns and children under 5 years, end epidemics of AIDS, malaria, tuberculosis, and neglected tropical diseases, and to increase health financing. In order to respond to the HIV epidemic in terms of resource allocation for prevention and control of HIV (programmatic planning), there is need to understand its dynamics in terms of new infections according to identifiable characteristics such as different age groups, sexes, geographical regions and population groups (sex workers, people who inject drugs, men who have sex with men).

This study aims at developing a model to estimate the distribution of new HIV infections in accordance to the different population groups and regions.



Transforming universities for a changing climate

Dr. Jackline Nyerere of the Department of Education Management Policy and Curriculum Studies is the country lead for a project titled ‘Transforming Universities for a Changing Climate’ having won a multidisciplinary grant from ESRC worth £280,129.57. The project aims at strengthening the contribution of universities to addressing the causes and impacts of climate change in lower-income contexts in four countries each of which is mobilizing to develop policies and action to address the damaging impacts of climate change - Brazil, Fiji, Kenya and Mozambique. It seeks to contribute to the broader task of understanding the role of education in achieving the full set of Sustainable Development Goals, and to bring impact at the local level through locally designed initiatives to transform the curriculum, make campuses more sustainable, and empower students, staff and local communities to work collaboratively.

The project recognizes that higher education institutions have a crucial role to play in responding to the climate crisis, not only through carrying out research, but also

through teaching, community engagement and public awareness. These roles of universities are critical in addressing climate change, given the deep social, political and economic roots of the crisis, and the need to engage with professional development, civic action and public awareness. It is also clear that despite the potentialities of universities more could be done particularly in low and middle-income countries where there is disproportionate impact of the most devastating effects of climate change.

The study countries, Kenya, Brazil, Fiji and Mozambique were selected not only on account of the vulnerability of their populations to climate-related disasters, but also because of the potentialities of their higher education systems for responding to the challenges, and in generating learning that can be utilized in other contexts. The project will be implemented in 4 work packages: (i) analyzing the systems of higher education in the participating countries, (ii) Contextualizing universities as change makers in their communities and beyond, (iii) Building a theory of university impact, and (iv) Sharing knowledge globally.





KU Researcher's quest to enhance **accountability for sexual violence through forensics**

Prof. Richard O. Oduor of the Department of Biochemistry, Microbiology and Biotechnology is part of a collaborative project which was awarded a research grant by the Foundation Peace Dialogue of the

world Religions and Civil Society through the University of Leicester to conduct a study entitled, **'Testing new forensic DNA methods to enhance accountability for sexual violence in Kenya'**. The project which was awarded USD 31,824.72 is a follow up to the successful collaborative pilot study on Forensic DNA analyses.

The project aims to improve prosecution rates, by enabling access to recovery and preservation of DNA evidence in low-resource environments, where full forensic medical examinations are not available. It is anticipated that the outcomes of this project will find great application within the ambits of law and enhance proper use of human genetic information in Kenya, and ensure that, even in exceptional circumstances, human rights, justice and sustainable development are not compromised.

Collaborators in this project include Government Chemist, KEMRI, University of Leicester, Directorate of Criminal Investigations and Wangu Kanja Foundation.



Exploring virtual reality technology to **enhance maternal care to migrant mothers**



*Dr. Josephine Gitome (Co-PI),
Department of Philosophy and Religious Studies*



Traditional Birth Assistants mothers experiencing virtual reality and spatial audio through which their story on traditional birth assistance practice will soon be narrated.

27,415.86 by the Global Challenges Research Fund (GCRF) aims to document traditional birth assistants and refugee midwives/safe mothers' informal knowledge pertaining the provision of vital maternal care in an emergency context, like the Dadaab refugee camps (one of the world's largest, and longest standing camp). The project will be using immersive storytelling (Virtual Reality and spatial audio) to document women's knowledge, with these stories, digital toolkits that can then be used to train future midwives will be produced. The toolkits will also be used by humanitarian workers (UN & MSF) to help health practitioners better understand sensitive, culturally appropriate maternal care from the perspectives of TBAs and refugee midwives/safe mothers.

The researchers championing the project from Kenyatta University include Dr. Josephine Gitome(Co-PI)of the Department of Philosophy and Religious Studies, assisted by: Dr. Newton Kahumbi, Philosophy & Religious Studies Department KU, Dr. Muthoni Mainah Sociology, Gender & Dev Studies Department KU and Ms. Jacqueline Mutheu Ndambuki Kituku Department of Community and Reproductive Health, Kenyatta University. The team from Newcastle comprises of the project Principal Investigator (PI) Dr. Jennifer Bagelman and Co-PI Prof. Rachel Pain Geography.

In November 2020 a team of four from KU and Black Rhino VR Company managed to collect data from the TBAS and Refugee midwives, mothers and fathers' representatives in Dadaab. The analysis will soon form virtual reality content.



Emerging science of character strength intervention in overcoming emotional challenges among the youth



Dr. Christine Wasanga of the Department of Psychology was awarded a collaborative grant of USD 233,926.1 from Templeton World Charity Foundation (TWCF). The Project titled Shamiri: Improving Character Strengths, Wellness, Social Functioning and Academic Achievement in Kenyan High School Youths. Emotional problems are common among youths in Sub Saharan Africa (SSA) who cannot access professional help there is need for brief, low-cost and scalable interventions.

The emerging science of character strength intervention offers promising solutions. Besides cultivating character strengths, these interventions have also been shown to help young people overcome emotional challenges. One advantage is that they can be delivered by non-professionals in community settings and at low cost. In two previous trials of a program called Shamiri (Swahili for “thrive”) that focused on three character strengths: gratitude, growth mindsets, and purpose, it was found that a four-week intervention delivered by non-professionals caused significant improvements in depressive symptoms, anxiety symptoms, social support and academic functioning among Kenyan high school students.

In expansion of this previous a large randomized controlled trial will be conducted to compare the effects of the three character strength interventions. Components of Shamiri will be analyzed to determine which are most helpful, and in turn, which character strength interventions are most important to disseminate

Key project objectives:

- to advance the science of character strength interventions
- to cultivate three key character strengths (gratitude, growth, and purpose)
- to understand which interventions are suitable for further development and widespread dissemination

The project is being implemented in collaboration with a team from Harvard University led by Dr. John R. Weisz, a Co-Director of the project. The other researchers are:

- Mr. Tom L Osborn, Project Operations Sub-Director. (Kenya)
- Mr. Akash L Wasil, Project Scientific Co Sub-Director. (United States)
- Ms. Katherine E Venturo-Conerly, Project Scientific Co Sub-Director.

Besides cultivating character strengths, these interventions have also been shown to help young people overcome emotional challenges

Family planning critical in achievement of SDG 11 – KU researcher explores

Dr. Eliphaz Gitonga of the Department of Population, reproductive health and community resource management housed in the school of Public Health and applied human sciences has won a competitive Urban Family Planning research and policy fellowship funded by International Union of Scientific Study of populations (IUSSP) and is being supervised by IUSSP Panel on Family Planning, Fertility and Urban Development. The funded project at USD 41,000 is “Family planning among blended Somali Women aged 15 -39 years in Nairobi: Barriers and Inequalities in Nairobi City, Kenya”.

By 2050, it is estimated that 2 billion of the world’s population will be living in urban areas. With an annual growth rate of 4%, Nairobi city (the study location), the Kenyan capital, is one of the fastest growing cities in sub-Saharan Africa and is projected to increase in size to five million residents by 2025. Such rapid urban growth has negative influence on health of vulnerable populations such slum dwellers, adolescents,

orphans and refugees. Family planning is critical in achieving SDG 11 (sustainable cities and communities) by improving human rights of women via enabling them to choose the number of children, timing, spacing and contraception. Currently most researches have no linkage with policy thereby deeming them only academic and reducing sustainability of any interventions. The project will bridge this gap through production of policy relevant/appropriate evidence, stakeholder engagement, policy communications and effective dissemination of key findings to target global and local audience.

Key relationships that will be established in this study is urbanization and family planning, barriers/inequalities of family planning services among vulnerable city populations and the family planning policy situation of urban vulnerable communities.



SDG 11

11 SUSTAINABLE CITIES AND COMMUNITIES



Identification of sensor targets for **low cost soil fertility assessment**



Dr. Ezekiel Mugendi (with cap and notebook) in the field during planting

Dr. Ezekiel Mugendi Njeru of the Department of Biochemistry, Microbiology and Biotechnology in collaboration with Dr. Andrew Ward of the University of Strathclyde, UK and Dr. Ruben Sakrabani of Cranfield University, UK recently secured seed funding of GBP 4,740 from the Royal Academy of Engineering, UK to help build a new collaborative research project. The long term aim of this project

is to create a low cost, portable sensor that can be used by farmers to determine soil fertility status in the field in real time. Soil samples will be studied from a number of smallholder farms in east Kenya to identify the key chemical and biological markers indicative of fertile soil conditions. To achieve this, chemical testing of samples will be performed in Kenya, looking specifically at nitrogen, phosphate and organic carbon.

This will be augmented with DNA sequencing in the UK, which will be used to determine the microbial communities within each sample. Following sample collection, a workshop and field trip will be held within Kenya to identify the most suitable markers that could form the basis of a low cost sensor platform. Additionally, the data from the project will support research on the best soil amendment strategies for smallholder farmers. The project represents a new multidisciplinary collaboration and will springboard the development of

rapid, affordable soil testing technology, informing “best bet” soil amendment strategies leading to increased crop production.



Capacity Strengthening in Technology Transfer and Commercialization of University Intellectual Property

DAAD
HRK



Dialogue on Innovative Higher Education Strategies



Dr. George Kosimbei,
Director, Innovation
Incubation and
University-Industry
Linkages

Kenyatta University in collaboration with the University of Rwanda and Neu-Ulm University of Applied Sciences in Germany won a grant of €216,956 for Capacity Strengthening in Technology Transfer and Commercialization of University Intellectual Property (TT-CUIP) under the DIES-Partnerships with Higher Education Institutions in Developing Countries. Kenyatta University and the University of Rwanda will pursue the goal of more effective university-industry linkages, where there would be visible products and services in the market associated with university

intellectual property and research. In order to accomplish the above functions, the universities' Technology Transfer Offices will carry out a very variable range of activities relating to different channels of knowledge and technology transfer based on contracts between the university and a third party. These channels include: collaborative research, contract research, consultancy, spin-off and start-up companies, licensing, patenting, and incubator facilities (Chandaria Business Innovation and Incubation Centre (CBIIIC) at Kenyatta University and the Grid Innovation and Incubation Centre (GIIC)

at the University of Rwanda's College of Science and Technology). The project team on the Kenyatta University side is comprised of project manager Dr. George K. Kosimbei, and members Dr. Shadrach Mambo, Prof. Michael Gicheru and Prof. Benard Njihia.



KU Don explores the use of **isotope technique applications to assess the effects of nutrition related interventions**

The Kenyan population is rapidly becoming overweight and obese. Obesity which is the new “silent killer” occurs when there is repetitive ‘energy imbalance’, where more calories are consumed than expended as energy through physical activity. Obesity is a true disease and a major risk factor of non-communicable diseases (NCDs) which continue to overwhelm the already over-stretched health services. Many factors influence people’s food consumption. In

African culture, obesity is perceived as a sign of power, prosperity, respect and obese people may be eye appealing. These attitudes make obesity seem harmless, if not explicitly attractive. Research contributes to understanding obesity as whether it is just weight(kg) compared to height(m2), known as Body-Mass Index (BMI) or whether body composition (what the body is comprised of) would be a better indicator, dividing it into fat mass (FM) and fat free mass (FFM).

Kenya has been member state of the UN-IAEA since 1965 and has actively

participated in IAEA’s Technical Corporation (TC) Projects. In the recent IAEA funding cycle, Kenya, led by Kenyatta University in collaboration with the IAEA, developed a National Nutrition project KEN6025; Enhancing the Use of Isotope Technique Applications to Assess the Effects of Nutrition Related Interventions.

The IAEA approved budget for this 4-year (2020-2023) project is Ksh. 33 million. The project is in line with the government’s Big 4 Agenda – Universal Health Coverage and Food and Nutrition Security. This project is led and implemented by Kenyatta University’s Department of Food, Nutrition and Dietetics under the lead of Dr. Dorcus Mbithe David-Kigaru who is the Project Lead scientist and Counterpart together with partners from Ministry of Health and other collaborators.



Dr. Dorcus Mbithe David-Kigaru



ERASMUS + International Credit Mobility Fund 2020-2023

Kenyatta University and Linnaeus University Collaboration



The coveted Erasmus + mobility fund has been awarded to Kenyatta University (KU) and Linnaeus University (LNU) Sweden. LNU and KU have had a long standing collaboration dating back to 2011 with the Linnaeus/Palme project. This new mobility project fund will enable KU and LNU to participate in the joint vision of internationalization of their programmes. The aim is to help in the creation of an international mind set in students and members of staff as well as to stimulate learning processes that prepare students to become successful in a globalized world. For sustainability, this fund will help to open up collaboration space in education and research activities on both continents of Europe and Africa for the next generation of students/professionals in the academics

Cross border mobility has been part and parcel of Kenyatta University (KU) internationalization strategy through this project, staff and students will participate in studies by travelling to Linnaeus and Kenyatta

Members of the department of Ed. Communication Technology together with a team of faculty from Linnaeus University (LNU) Sweden during a group photo

University. The project will seek to enhance KU’s vision of extending the collaboration with European universities It is expected that the increase in staff members competences from this project support desired increase in education quality specifically in contemporary pedagogy, research, transfer of know-how and education technologies.

This novel Erasmus+ funded project will also contribute towards establishing regional and international networks for prosperity. The funding is a great milestone towards the University’s efforts of building a strong versatile and informed academic staff and employable graduates



Banana paper: commercializing eco-friendly packaging and sanitary towels



Dr. Jackline Kisato,
Project PI

In today's world, environmental sustainability is an imperative aspect for development and a supporting pillar of the world's ecosystem. Natural fibres are attributed as being at the heart of an eco-fashion movement that seeks to create products that are sustainable at every stage of their life cycle; from production to disposal. With the banning of single use polythene bags and the environmental concern of pollution from sanitary towels, it has

become vital to find alternative cost effective materials that can be used to produce these products. Additionally, researchers posit that it takes up to 400 years to decompose these non-biodegradable polymers used in polythene bags, resulting in pollution of water bodies globally, blocking the smooth water filtration and percolation into the soil thus putting soil fertility in jeopardy (NEMA, 2014). The bio-degradable packaging and sanitary towel project is a 3 year National Research Fund (NRF) funded project of Kshs. 18,805,500 under the industrialization, manufacturing and agro-processing sector.

The project synergizes expertise from, material science, chemistry, engineering, fashion design and entrepreneurship to create packaging prototypes and sanitary towels from banana pseudo stems and appropriate business models for commercialization of these products.

The team comprises of Dr. Jacqueline Kisato of the Department of Fashion Design and Marketing as Principal Investigator (Kenyatta University), Co investigators: Prof Ambrose Kiprop (Moi University), Dr. Jerry Ochola (Moi University) and Dr. Kenneth Chelule (KIRDI). Dr. Mercy Wanduara (Kenyatta University) has been co-opted as a member of the team to enhance the production aspect of the project.

The project envisions graduating students at masters/ PhD level to further research and academic inquiry. The team of multi-disciplinary researchers will design machinery and produce minimum viable biodegradable packaging products and sanitary towels from banana pseudo-stem waste as one way to replace the toxic plastic packaging waste threatening the environment.



KU Researchers explore use of finger millet and oyster mushrooms in management of Type 2 Diabetes



Prof. Hudson Nyambaka of the Department of Chemistry was awarded a multidisciplinary grant of Kshs. 19,999,865 by National Research Fund for the study, entitled **“Value addition to finger millet-based food products and their efficacy in the management of hyperglycemia, hypertension and promotion of nutrition security among Type 2 Diabetics in Kenya”** aims to formulate bioavailable nutrient rich food-based products from finger millet and oyster mushrooms for management of hyperglycemia, hypertension while providing nutrient security among Type 2 Diabetics (T2D). Most people with T2D have secondary hypertension, with between 60 % and 90 % among them being hypertensive.

Finger millet is rich not only in chromium, calcium, potassium and phosphorus but also in dietary fiber that slows glycemic response, and essential amino acids. Oyster mushroom is also rich in essential amino acids and, in addition, fatty acids (linoleic acids), minerals (iron, zinc, potassium, calcium, phosphorus and vitamin (C, D and B series).

The study will formulate bioavailable products from finger millet and oyster mushrooms and test their efficacy using animal models and randomized controlled trials. Education to key stakeholders on products will be done to enhance acceptability and continued production and utilization. The resultant nutrition products and their use will not only contribute to the management of hyperglycemia and hypertension in T2D conditions but also in the management of other nutrition related conditions such as low body immunity while ensuring nutrient security for general health and wellbeing.

This multidisciplinary project, which is in the first phase, is a collaboration of three institutions: Kenyatta University (KU), Jomo Kenyatta University of Agriculture and Technology (JKUAT) and Kenya Agricultural and Livestock Research Organization (KALRO). The other team members

include; Dr. Judith Munga (Department of Food, Nutrition and Dietetics, KU), Dr. Everlyne Wanzala (Department of Pharmacognosy, Pharmaceutical Chemistry and Pharmaceutics & Industrial Pharmacy, KU), Dr. John Kinyuru (Department of Food Science and Technology, JKUAT) and Dr. Chrispus Oduori (Food Crops Research Institute (FCRI), KALRO Kisii Centre). The study will support seven PhD and four MSc students.



Oyster mushrooms



Finger Millet

NRF Multidisciplinary Projects



The National Research Fund (NRF) has a mandate to mobilize, allocate and manage financial resources to facilitate an effective national innovation system that would create required knowledge and innovations in all fields of Science and Technology for the growing economy. NRF allocates resources for competitive multi-disciplinary research and collaborations among Universities and research institutions. Kenyatta University faculty have continued to competitively apply in large numbers with a good number of proposals being successful, either as PI's or in a collaborative capacity as Co-PI's. Some of the collaborative projects



Eng. Dr. Isaiah Bosire Omosa

Dept. of the Civil Engineering Department

Grant: Kshs. 19,930,000

Project Title: Development of novel construction materials and energy generation systems that make use of selected agricultural waste

The project is being administered by University of Nairobi in collaboration with Kenyatta University and Jomo Kenyatta University of Agriculture and Technology



Dr. Evelyne Samita

Dr. Catherine Muui



Dept. of Agricultural Science & Technology

Grant: Kshs. 18,919,600

Project Title: Propagation of *Ocimum kilimandscharicum* determination of efficacy against *Anopheles gambiae* ss and formulation of *O. kilimandscharicum* essential oils into jelly into jelly and bathing soap mosquito repellent

The project is being administered by Karatina University in collaboration with Comet Health Care Limited and Kenyatta University



Dr. Margaret Muturi

Department of Medical Laboratory Science

Grant: Kshs. 12,356,250

Project Title: Developing low-cost diagnostic tools and biosensors for rapid detection of crop and human pathogens in Kenya

The project is being administered by ISAAA AfriCenter in collaboration with University of Nairobi, Kenyatta University and National Commission for Science, Technology and Innovation



Adaptive collaborative research on climate smart crops; livestock and aquaculture; socio - economic research; land, water and agroforestry; and sustainable bio-energy

2020 SUB-AWARDEES

Climate-smart agriculture (CSA) aims to achieve three outcomes (triple wins):

- i. sustainably increasing agricultural productivity and incomes;
- ii. adapting agricultural systems and building resilience to climate change; and
- iii. reducing greenhouse gas (GHG) emissions. It offers an appropriate strategic framework for responding to the challenges.

Meeting these challenges requires technologies, innovations and management practices (TIMPs) to build resilience and

adaption to climate change.

TIMPs exist within the National Agricultural Research System (KALRO, KEFRI, KIRDI, KMFRI, agricultural universities and others), developed by scientists in these institutions, which can respond to Climate-smart agriculture needs of the country. Some of these TIMPs require further testing, prior to their up-scaling for adoption in the target project counties. KALRO received research funds under the Kenya Climate Smart Agriculture Project (KCSAP) facilitated through a Credit from the World Bank to Government of Kenya, acting as administrator of the research funds provided through the Ministry of Agriculture

Livestock and Fisheries. Towards this end, competitive grants were awarded to various multidisciplinary teams; we applaud our researchers who were awarded as co-investigators to projects lead by KALRO



Prof. Lucy Kabuage

Department of Agricultural Resource Management

Grant: Kshs. 8,790,600

Project Title: Development, Validation and Promotion of Climate Smart Indigenous Chicken for Improved Productivity



Prof. Maina Mwangi

Department of Agriculture Science & Technology

Grant: Kshs. 5,000,000

Project Title: Use of Climate Smart Technologies to Enhance Open Fields Tomato Productivity in arid and Semi-Arid Areas



Dr. Joseph Gweyi

Department of Agriculture Science & Technology

Grant: Kshs. 1,068,346

Project Title: Scaling Integrated Soil Fertility Management Tech. for Improved Food Nutrition Security and Livelihoods in Kenya



Dr. Purity Nguhiu

Department of Agricultural Resource Management

Grant: Kshs. 2,830,500

Project Title: Enhancing Goat Market in Kajiado and Taita-Taveta Counties through Improved Contagious Caprine Pleuro Pneumonia Vaccine and diagnostics

IFS Grants



The beautiful yet **destructive** **Lantana camara**

Mr. Julius Waititu of the department of Urban and Regional Planning has secured a research grant of USD 14,050 funded by International Foundation for Science (IFS), Sweden. The award will support his PhD research entitled **“Developing a spectral index to identify Lantana camara L. Invasive shrub from co-occurring vegetation.”** This research focusses on lantana mapping through hyperspectral and multispectral remote sensing. Alien invasive species negatively affect the functions of fragile ecosystems such as forest resources, water resources, and agriculture. Lantana camara L. invasive species has been listed as an agent of biodiversity change in natural habitats since its introduction in Kenya in the 1950s. Its adaptability and fast spread to new

habitats like the undisturbed protected areas has led to ad-hoc mapping campaigns by agencies such as the Kenya Wildlife Service, these campaigns are not only costly and time-consuming but also do not result to complete eradication. Alternative methodologies involving the use of remote sensing data need to be used so as to balance on costs and accuracy in invasive species monitoring system for effective conservation actions

Few studies have employed hyperspectral data in mapping the invasive species it follows that the method will involve modelling the species spectral responses during its various growth stages to determine its unique separability with co-occurring vegetation using field hyperspectral remote sensing. This spectral information will be needed for development of a unique spectral index for its discrimination from the rest of vegetation with hyperspectral and multispectral images. In addition, the modelling part will provide

insights on the best time for its mapping and application of control measures within invaded habitats. The project's outcomes will provide immediate assessment on areas under lantana within area of study. In addition, the study would set precedence and define a novel methodology to map the expert of various invasive species, in a bid to design their control measures.

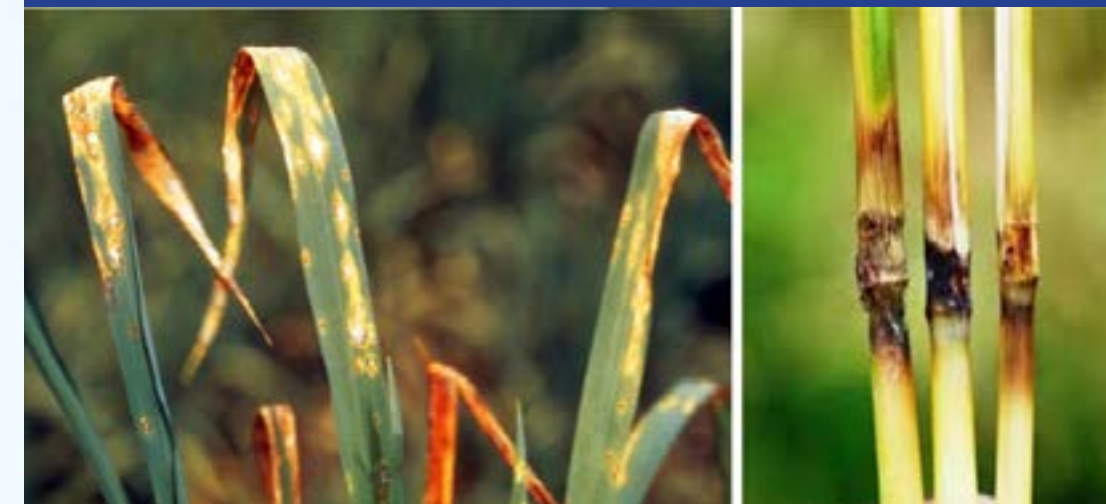


Julius Maina Waititu (L) during field reconnaissance



Wycliffe Luasi

Dept. Biochemistry, Microbiology and Biotechnology, Kenyatta University



Blast infected millet stems and leaves

Mr. Wycliffe Luasi of the Department of Biochemistry, Microbiology and Biotechnology, Kenyatta University - Plant Transformation Laboratory has been awarded a research grant of USD 14,979 by the IFS towards his PhD research titled “Bioengineering blast resistance in finger millet through targeted mutagenesis of ethylene response factor transcription factor gene.”

Blast disease caused by a fungal pathogen *Magnaporthe oryzae* is one of the major factors affecting finger millet growth and yield. The disease has been singled out as a top constraint to finger millet production since most landraces and a number of other genotypes are highly susceptible, with average losses owing to blast estimated

at 28-36%, and in certain areas, as high as 80-90% yield losses have been reported. Enhancing the resistance of finger millet to *M. oryzae* has been shown to be the most economical and effective approach for controlling blast. Various studies have shown that expression of ethylene response transcription factor gene suppresses expression of defense genes and resistance

against *M. oryzae*.

Mr. Luasi's research focuses on improving resistance of finger millet against blast disease by introducing frameshift mutations in ethylene response transcription factor gene through site-specific mutagenesis.

b. Ongoing Research

Leveraging on **technology enabled learning for enhanced and blended learning project**

In an increasingly globalized environment anchored in knowledge based economies, the demand for 21st Century workforce equipped with modern technology skills and competencies has reconfigured the manner technology is used in many sectors including education. Technology holds immense potential in transforming teaching and learning in higher educational institutions world over. As one of the leading institutions of higher learning in the region, Kenyatta University has sought to leverage on the affordances of technology enabled learning to promote academic excellence. The identification of the KU as one of the partners in the Partnership for Enhanced and Blended Learning (PEBL) could therefore not have come in the right time.

The PEBL project started in September 2017 with the support from UK Department for International Development (DFID'S) Strategic Partnership for Higher Education Innovation and Reform (SPHEIR) Portfolio, led by the Association of Commonwealth

Universities working with various partner Universities in East Africa, technical partners and higher education commissions. The partner universities include Kenyatta University – Kenya, Strathmore University – Kenya, Makerere University - Uganda, University of Rwanda, Open University of Tanzania, and State University of Zanzibar.

The Technical Partners include Staff and Education Development Association (SEDA), Commonwealth of Learning (COL), University of Edinburgh.

There are close to 20 participant universities drawn from the East African region participating in the project.

The Technical Partners

- Staff and Education Development Association (SEDA),
- Commonwealth of Learning (COL),
- University of Edinburgh.

Higher Education Commissions in the EA countries

Partner Universities

- Kenyatta University,
- Strathmore University
- Makerere University
- University of Rwanda
- Open University of Tanzania
- State University of Zanzibar
- 20 participant universities from East Africa

Expected Project Outputs

- Improved network for sharing degree courses through blended learning
- Online platform (OER Africa) and Individual Learning Management System
- Increased capacity to support pedagogical approaches for blended learning
- For partner and participating universities in East Africa
- Strengthened Quality Assurance systems for blended learning courses
- High quality credit bearing blended learning courses included within regular programmes

As a key task, team members in the partner universities underwent a one year training conducted by SEDA to equip them with the knowledge and skills to ensure effective delivery and achievement of the project outputs. This culminated into the award of a Certificate in Developing People and Enhancing Practice (DPEP) and certificate in Supporting Technology Enabled Learning (STEL) to successful participants. The KU PEBL team members led by Dr. George Onyango (the Dean) comprising of Dr. Elizabeth Mwaniki and Dr. Rhoda Gitonga were among the successful participants awarded the two certificates each. Other members who have



Participants and trainers during the PEBL workshop held at the Kenyatta University Conference Centre

successfully completed the courses include; Dr. Samuel Mutweleli, Dr. Eric Masika, Dr. Syprine Oyoo and Dr. Hellen Kiende

Milestones realized - Development of the Blended Learning Policy – provides guidelines for the delivery of the face to face (full-time & part-time), Virtual and Open Distance Learning, and Continuing Education Programmes

Outputs achieved

1. Two modules developed Introduction to Entrepreneurship' and 'Psychology of Learning' as Open Education Resources -

hosted on the OER Africa the third module Management Accounting 1 is under development, Further, the university has embarked on the development of interactive blended learning modules across all the programmes and year groups.

2. Capacity development of faculty, more than 1000 faculty members have been trained in the facilitation of online learning and more specifically online pedagogies.

3. Quality Assurance rubric developed - to ensure the quality of blended teaching and learning activities.

African Development Bank (AfDB) doctoral and masters training programs in Applied Chemistry and Physics

The School of Pure and Applied Science has been implementing a postgraduate training program in the departments of Chemistry and Physics since January 2016 to date. This was made possible through joint funding by the Government of Kenya (through the Ministry of Education) and the African Development Bank (AfDB). The grant is ably managed through an implementation committee appointed by the Vice Chancellor and chaired by Prof. Joseph J. N. Ngeranwa. The grant targets academic staff in public universities as well as public technical training institutions for capacity building especially in attaining masters and Ph.D degrees in Engineering supporting Sciences.

Benefits

The students have been exposed to world class exposure through joint co-supervision with experts at the national, regional and international levels. The students have been able to utilize advanced research facilities through the extensive research collaboration networks. Two Ph.D students from the

Physics department have also visited other collaborating laboratories in Germany and South Africa.

One Ph.D. student from Chemistry Department was awarded a 74th International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) PhD grant for participation in the 74th RILEM 40th Cement and Concrete Science Conference hosted by the University of Sheffield. An international conference is being planned for 2021.

Research areas

- atomic collision physics
- materials science,
- nanotechnology
- chemical ecology
- theoretical chemistry
- environmental
- radiation physics
- applied analytical chemistry
- cement chemistry
- natural products chemistry
- inorganic chemistry

Postgraduate
Students
enrolled

34 Ph.D
28 M.Sc

Key outputs

- Various teaching, learning and research equipment and instruments have been procured for the departments of Chemistry and Physics
- 6 Ph.D and 6 M.Sc. students successful completed
- 2 day dissemination workshop hosted by School in 2018 in collaboration with Tanzania Medical Institute and University of Johannesburg

International Conference planned for 2021



Beneficiaries of AfDB grant with their mentors during the 2 day dissemination workshop in 2018



Cross transfer of disease causing bacteria between livestock, wildlife and humans

Dr. Lucas Asaava (left and right) recording data collected from camels during field work.

Zoonotic diseases are those diseases that pass from an animal or insect to a human. Nontuberculous Mycobacteria (NTM) cross infect a wide range of domestic animals, wildlife and man causing various diseases. Despite the public health implications associated with infection with these uncommon bacteria, information on the identification, frequency, pattern and determinants of zoonotic NTM is scanty.

Recent data indicates that there has been an increase in occurrence of human NTM infections locally and globally. In humans, these Mycobacteria are associated with progressive lung disease often resistant to antibiotics, superficial cervical lymphadenitis (the presence of a painful mass in the cervical area, often accompanied by fever, runny nose, sore throat, and cough, skin infection

and disseminated disease (most common and typically involves lungs, heart, liver, intestine, lymph nodes and bone marrow).

In both humans and animals, they are important due to misdiagnosis with other notifiable mycobacterial diseases such as tuberculosis (TB). A one-health approach study involving Arabian camels and associated household members presumed to have TB was carried out in Samburu East sub-County. Screening of milk producing camels for Mycobacteria infection was done and a milk sample from tuberculin test reactive camels was collected for confirmatory mycobacteriology and molecular tests at Kenya medical research institute (KEMRI)/ centre for respiratory disease research (CRDR) enhanced BSL2 laboratory. Several bacteria of medical

importance were isolated in camel milk and Human saliva and mucus. The response by all respondents was that fresh and fermented milk were consumed without boiling. While there is need for more robust studies to further unravel their true significance, there is no doubt that these uncommon bacteria cross transfer diseases.

The study came up with two important public health policy recommendations, first, the declaration of NTMs as notifiable infections and second, is the establishment of monitoring and surveillance systems in both humans and animals to determine the true burden of these infections and in order for those affected to be identified and treated appropriately.



CLISMABAN Project Pioneers keen on establishing Centre for improved cooking bananas and plantain hybrids at KU

Prof. Grace Wamue-Ngare and Ms. Mary Mwangi (in orange t-shirt) pose with participants during a gender training brainstorming workshop



The CLISMABAN project is being implemented by a consortium of researchers from Kenya, Uganda, Spain and Belgium and is funded by the LEAP-Agri: EU-Africa Research and Innovation grant. The project is aimed at exploiting the existing genetic resources and diversity of bananas to select varieties resilient to climate change-induced constraints, using a participatory gender responsive and all-inclusive approach in the banana and plantains value chains. CLISMABAN has a strong capacity building strategy targeting both producers and researchers, training them in different aspects of the banana research- to- market pipeline, with the aim being to stimulate better utilization of scientific results.

The Kenyan team which comprises of Prof. Grace Wamue -Ngare of the department of Sociology, Gender & Development studies and Mary Mwangi of Biochemistry, Microbiology and Biotechnology have embarked on popularization and evaluation of improved cooking banana (NARITA) and plantain (PITA) hybrids using a participatory, gender-integrated approach.

Prof. Ngare offers the gender strategy for the entire project team, the participating farmers and other players in the banana and plantain value chains. In this, she advises on affirmative action, where applicable, especially in all training and knowledge transfer activities while Ms. Mwangi works closely with other scientists in the team to identify the most promising accessions for evaluation in Kenya. This culminated in the

importation of in vitro cultures of certified germplasm from the International Banana transit centre in Ibadan Nigeria. Further, Prof. Rony Swennen a consortium members and a lead scientist in the development of the hybrids facilitated the importation of the germplasm to Kenya for the first time. As per the KEPHIS requirements, Kenyatta University has supported the establishment of a tissue culture laboratory to specifically propagate the new varieties. So far, 25 accessions of NARITAs have been successfully multiplied, acclimatized and planted in the Kenyatta University Research farm. Data collection on agronomic performance is ongoing in the laboratory, greenhouse and the farm. This information will guide the selection of the most promising accessions.

The next step is to embark on participatory varietal selection whereby gender-integrated farmers will work closely with the researchers to identify the most desirable varieties based on agronomic and sensory evaluations. The sustainability plan is one, to utilize the laboratory for training and commercial propagation. The team is looking into the possibility of establishing an in vitro cooking banana and plantain germplasm conservation centre at KU, as well as extending the demonstration and research farm for the climate resilient varieties at the KU, Kitui campus.



Ms. Mary Mwangi in the lab

c. Partnerships

Kenyatta University Researchers **Building Strong University Industry Partnerships**



Kenyatta University through the Directorate of Capacity Development and Consultancy Services has been awarded projects worth Ksh.40M by National Industrial Training Authority (NITA) to offer job-specific training, arrange internship and placement in ICT computer repairs and maintenance in Nairobi, Nakuru, Kisumu, Kwale and Mombasa counties. The Kenya Youth Employment and Opportunities Project (KYEOP) is a five year (2016-2021) Government of Kenya and the World Bank funded project. It aims to increase employment and earning opportunities among targeted youths. The main beneficiaries of the programme are youth aged between 18 and 29 years, who are have experienced extended spells of

unemployment or who are currently working in vulnerable jobs.

The numbers of beneficiaries who have successfully gone through the training, internship and placement by KU are 1,042 youths spread across the six counties. The University posted an average transition rate of 95% from training to internship and 82% from internship to placement phases of the project. The University has been contracted to implement additional trades as: photography and videography, landscaping and interior design, and disk jockey and music production. The University has participated in cycles one to four of the project in six counties including Bungoma County.

University researchers on this project have trained beneficiaries using a competency based curriculum that includes monitored internship and placement activities. The team ensures that each intern regularly records work activities in a logbook while the employer monitors the performance of the intern(s), reviews the logbook, writes down competencies achieved, areas for improvement and provide guidance and mentorship focused on improving job performance. This project is a testament of the active role the University plays in the industry.

The KU researchers are: Prof. Simon Onywere (Project advisor), Mr. James Ombogo Onditi (Project lead and County coordinator); Prof. John Aluko Orodho (County coordinator) Mr. David Ngigi (County coordinator) Dr. Hannah Orwa Bula (County coordinator), Mr. James Odhiambo Oringo (County coordinator) Mr. John Maraigua (Secretariat).

Departments exploring research partnerships and collaborations

Joint International Symposium on **“Partnership in Sports and Development for Tomorrow”**



Delegates from Kenyatta University (KU), University of Tsukuba (UT), and Japan Society for Promotion of Science (JSPS), Anti-Doping Agency of Kenya (ADAK), Kenya Judo Association (KJA), and Kenya Wildlife Services (KWS) during the International Symposium on “Partnership in Sports and Development for Tomorrow” held on 3rd March 2020 at BSSC, Kenyatta University.

Kenyatta University (KU) partnered with University of Tsukuba (UT) and Japan Society for Promotion of Science (JSPS) to host a Joint International Symposium on “Partnership in Sports and Development for Tomorrow”. The symposium which was coordinated by the Department of Physical Education, Exercise and Sports Science was held on 3rd March 2020 at BSSC, Kenyatta University. The symposium was part of the on-going initiatives to establish long term partnership and collaborations in Physical Education and Sports Studies related areas between KU and University of Tsukuba, Japan.

The forum was organised to enable discussions on current educational and research trends in sports studies in Kenya and Japan, and possible areas of future collaborations. Other invited partner institutions that participated in the symposium included Anti-Doping Agency of Kenya (ADAK), Kenya Judo Association (KJA), Kenya Wildlife Services (KWS), Mount Kenya University (MKU), and Athletics Kenya (AK).



Dr. Francis Mundia Mwangi, Chairman, Department of Physical Education, Exercise and Sports Science, Kenyatta University (right) and Prof. Takeshi Nishiyasu, Dean, Faculty of Health and Sport Sciences, University of Tsukuba, during the signing of Letter of Intent in December 2019, at University of Tsukuba, Japan.

symposium informed the development of specific initiatives and memorandum of agreements to operationalize the cooperation between Kenyatta University – the leading university in physical education and sports studies in East and Central Africa, and University of Tsukuba –the leading university in physical education and sports studies in Japan and the Asia continent.

This culminated to the signing of a Memorandum of Understanding in May 2020 between the University through the department of Physical Education, Exercise and Sports Science the University of Tsukuba in the field of Physical Education and Sports Studies. University of Tsukuba is the leading university in Physical Education and Sports Studies in Japan and the Asian continent. The MoU formed a basis of developing specific partnerships in academic, research and innovation, utility as well as community outreach activities related to Physical Education and Sports Studies. The cooperation will be in (but not limited to) the areas of Physical Education, Sports for Development and Peace, African Sport and Olympic-Paralympic Education, Sports and Diversity, Sports and Tourism, Coaching, Athletes Training and Anti-Doping Education, Sport Science and Medicine, Sport Psych-Sociology and Anthropology.

The cooperation between the two universities will mainly involve the School of Public Health & Applied Human Sciences and School of Hospitality, Tourism and Leisure Studies in Kenyatta University, and the Faculty of Health and Sport Sciences in

University of Tsukuba. It will involve faculty members and students, at undergraduate and graduate levels. The partners have already started organising joint activities including academic visits by faculty members across the institutions and joint symposium, and much more is expected to be realised through this cooperation.



Delegates trying their hand at some Japanese and Kenyan traditional games during the International Symposium on “Partnership in Sports and Development for Tomorrow” held on 3rd March 2020 at BSSC, Kenyatta University.

Translating the ‘Farmsmart’ App a collaboration between the **University of London** – School of Oriental and African Studies and **Kenyatta University** - Department of Kiswahili



Kenyatta University and the University of London (SOAS) have had an MOU on academic and research cooperation since 2016. It is under this collaboration that the Department of Kiswahili undertook a joint translation project with the School of Oriental and African Studies (SOAS) –London in the month of July under the Coordination of Prof. Chege Githiora (SOAS) and Dr. Pamela Ngugi (KU). The international, collaborative exercise involved translating the entire content of a farming computer program or Application (“Farmsmart”) into Kiswahili.

Farm Smart is an innovative app developed in partnership with leading tech consultants, Amido. The app provides tailored crop recommendations to farmers based on factors such as their location and the season. The app aims to equip smallholder farmers with the tools to live off any plot of land and create a world where farmers are thriving, healthy and happy. The translation project has been completed and is ready for uploading on the Farmsmart

App created by the SOAS Team. The App is available on Google Play Store

The translation team members included Prof. Catherine Ndungo, Prof. Kitula King’ei, Dr. Miriam Osore, Dr. Leonard M. Chacha and Dr. Pamela Ngugi- Coordinator.



Prof. Chege Githiora – SOAS -Lead Coordinator

Dr. Pamela Ngugi - KU -Coordinator



Contributing to society empowerment through collaborations and partnerships – Department of Applied Economics

The Department of Applied Economics is currently involved in cutting edge research projects that are aimed at contributing to knowledge and availing solutions to communities in Kenya. 7 Members of the department are involved either as Principal Investigators, Co-Principle Investigators or researchers in the Women Economic Empowerment project by Bill and Melinda gates Foundation.

Additionally through its partnership with the International Committee for Development of Peoples (CISP) a non – governmental organization international

in Italy, the department is undertaking a collaborative research within a project titled ‘Safe Communities for Safe Children and Adolescents’. The project is being implemented in collaboration with CISP, national government agencies, county governments of Nakuru and Kakamega, civil society organizations from the two counties (K-NOTE and MARPA), and other local and international collaborators.

The department continues to seek for more research and consultancy opportunities through responding to request for proposals and establishing working collaborations with local and international organizations.

3

RESEARCH DISSEMINATION & UPTAKE





Prof. Monicah Mucheru-Muna
Department of Environmental Sciences and Education

Agronomic and economic effects of phosphate rock on acidic soils in TharakaNithi County

on maize yield, soil P-fraction and P-sorption.

The study was carried out in Tharaka Nithi County. Treatments comprised: Manure, Rock Phosphate, rock phosphate + manure, Tithonia diversifolia, Tithonia diversifolia + rock phosphate, CAN + TSP and Control. CAN+TSP recorded significantly higher maize grain yields compared to other treatments due to the readily available nutrients. Tithonia diversifolia and CAN combined with TSP had the highest labile P (Resin-Pi+Po and NaHCO3-Po) and moderately labile P (Pi+Po in NaOH) while control had the lowest. Soil P associated with calcium (HCl-P) was highest in sole Tithonia diversifolia. CAN+TSP recorded significantly higher P sorption levels and this could be related to the presence of readily available P that is then easily adsorbed on the soil colloids. Where organic inputs were used solely or in combination with phosphate rock, a decrease in P sorption was observed.

The project supported two master's students (Emily Mwake, Kenyatta University and Janey Okoth, University of Embu). One paper has been published and one is

under review. Two conference papers were presented in the Kenyatta University Biennial Research and Innovation Conference (KUBRIC) 2019. The project was implemented with the collaboration of University of Embu (Prof Felix Ng'etich) and NARL & KARLO Muguga laboratories.



Maize Plantations grown under the various soil treatments

Impact of gender shift in floodplain farming on local livelihoods and food security



Male inheritor grows horticultural crops along Karura floodplains

Traditionally, floodplain farming is gendered. On the one hand, women in Central Kenya cultivated food crops for household consumption in floodplains while on the other hand, men have dominated agricultural activities in the elevated lands. However, in recent past, there has been gender shift in the cultivation of food crops along floodplains. Men, especially in the peri-urban regions of Kiambu County, have taken over cultivation in floodplains from women. The reasons and implications of this shift have not been fully understood. The study supported under the Vice-Chancellor Research and Innovative Grant sort to explore the contributory factors

to the gender shift, the socio-economic implications and the impact on household food security in Kiambu County.

The key finding of the research were: (i) there is not only gender shift in the cultivation of floodplains from women to men dominated, but also on the type of crops grown (ii) the demise of the original owners and the patriarchal nature of the community where only sons but not daughters inherit the land as well as shift from food crop production which is female dominated to production of commercial crops which is male dominated were the main causes of the gender shift in the cultivation of flood plains; (iii) gender shift in cultivation of floodplain and of crops has by far affected social economic status and food security at household level with women who are wives of the men flood plain farmers cannot make decision on family finances and nutrition, resulting to lack of finances to meet their personal needs as well as lack of a healthy diet among other important findings.

These findings are significant because more than six hundred thousand of families depend on floodplains within the county for their livelihood. Also, about twenty millions of Kenyans depend on produce from the flood plains for food and nutrition security. These

findings will further up scaled to key actors and stakeholders including policy makers with the aim of informing policies on gender and agriculture, gender and empowerment, wetland policy and land ownership and property rights.

The results will be valuable in addressing gender specific challenges associated with floodplain cultivation, including development and implementation of relevant projects and programmes for redress. These outcomes will impact directly on achievement of the Kenya Vision 2030 as well as Sustainable Development Goals, particularly Numbers 1, 2, 3, 5, 8 10 and 13.



Woman rentee bends to weed her arrowroots using "muro" (panga) along Rueno floodplains

Dr. Muthoni Mainah
Department of Gender and Development Studies

Wood-boring beetles and the associated natural enemies of Naivasha thorn Tree

The Naivasha thorn tree, *Acacia xanthophloea* is grown for its multipurpose use such as foliage, timber, shade, apiculture, medicine and soil rehabilitation. However, its production is threatened by biotic constraints such as arthropod pests. A study funded by the **Vice Chancellor's Research and Innovation Grant** was conducted to document the abundance, species diversity and species richness of the wood-boring beetles and their associated natural enemies on *A. xanthophloea* in Nairobi and Machakos Counties.

The study involved collecting identified volume of infested pieces of *Acacia* which were taken to the laboratory and incubated in containers for pest and natural enemy emergence. The emerged adults were counted and identified using taxonomic features. Seventeen families of the wood-boring beetles were recovered 16, 17 and 6 families were recovered from KU, Mitaboni and Stoni athi, respectively.

A total of 7,959 individual wood-boring beetles from 16 families and belonging to 52 species were recovered in KU, 7,804 wood-boring beetles from 17 families and 55 species in Mitaboni, Machakos, and 2,326 wood-boring from 6 families from Stoni

athi. The Family Bostrichidae was the most dominant in KU and Machakos with 12 and 9 species accounting for 57.27% and 28.82% followed by Scolytidae with 20.43% and 14.9%, respectively. *Xylion adustus* accounted for 24.73% followed by *Glostatus* sp. 10.64% in Mitaboni.

The natural enemies are responsible for keeping the pest population under check. From the results it was observed that species diversity, richness and evenness differed with region. Higher species diversity of wood-boring beetles were observed infesting *A. xanthophloea* causing significant damage. Species richness (S), Shannon diversity index (H), and evenness (J) were higher at Mitaboni (S¼54; H¼2.45; and J¼0.614) than KU (S¼51; H¼2.33; and J¼0.596). Many specimens remain unidentified to species level due to lack of expertise, funds and export permit.

The study was conducted by Dr. Ruth Kahuthia-Gathu, senior lecturer in the Department of Agricultural Science and Technology



Wood Damage:

Wood-boring beetles of Acacia Xanthophloea

Family Lyctidae



Family Cerambycidae



Predators of the wood-boring beetles (representative)

Family Cleridae





KENFIN-EDURA holds international symposium

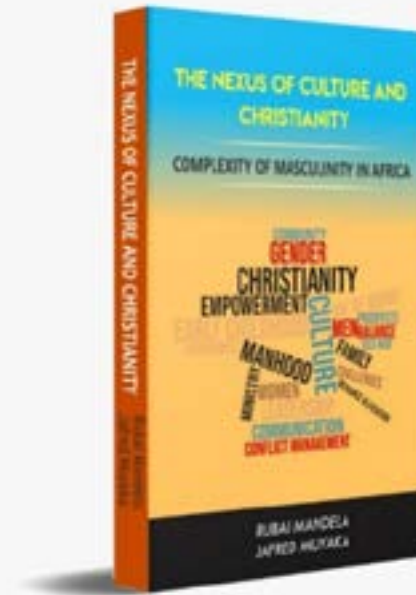
The overarching goal of the project is to promote the health and wellness of Kenyans through creative and impactful research and capacity development activities

Researchers from Kenyatta University, Kenya together with their counterparts from University of Helsinki as well as Haaga-Helia University of Applied Sciences in Finland have been working on a research project entitled, **“Building higher education and research capacity to address the physical activity and nutrition transition in Kenya: The Kenya-Finland education and research alliance (KENFIN-EDURA)”**.

The overarching goal of the project is to promote the health and wellness of Kenyans through creative and impactful research and capacity development activities. The primary objective of KENFIN-EDURA project is to establish if dietary patterns, physical activity and weight status in Nairobi City County, Kenya can be explained by income,

education, gender, family interactions and place of residence (urban low socioeconomic status and urban middle- socioeconomic status) as well as family interaction. The project will come to an end on 31st December 2021.

As part of its close out activities, the KENFIN-EDURA organized a dissemination symposium that brought together various stakeholders including researchers, practitioners, policy makers as well as the civil society. The symposium was held on the 4th December 2020 at Kenyatta University Conference Centre (KUCC). The event was officially opened by His Excellency Erik Lundberg, the Finnish Ambassador to Kenya.



Complexity of Masculinity in Africa

A reflection of the misconceptions that accompany implementation of well-meaning gender responsive programs

The Nexus of Culture and Christianity: Complexity of Masculinity in Africa is a book that promotes the understanding of manhood in Africa from a Christian biblical perspective. It explores the barriers that boys experience right from conception to old age and how such barriers inform manhood.

The book reflects on the misconceptions that come with implementation of well-meaning gender responsive programs in education, economic, social and political spheres, which are likely to have negative implications for men while trying to bridge the gender gaps that have disadvantaged women over time. As a response, suggestions

are made on how such programs could be made friendly to benefit women without excluding or disadvantaging men. The book recognizes that there have been cases of men and women failing to understand one another in the course of their everyday communication. Consequently, it walks men through strategies to effective communication and demonstrates how they could use their words to build their families, given the power that such words carry.

Utilization and sharing of scarce resources is examined as a potential aspect in men's life. Accordingly, the book illustrates how African men subscribing to the Christian faith could find a balance in the allocation of

resources available to them including time in a manner to be useful to the church ministry and community while not disadvantaging their families. The book acknowledges the role of men as mediators in conflict, and also prepares them for the challenges related to old age.

The book is authored by Dr. Rubai Mandela Ochieng, Co-Chairperson of Women Educational Researchers of Kenya (WERK) and a Senior Lecturer in the Department of Educational Foundations, Kenyatta University and Dr. Jafred Muyaka a Lecturer in the Department of Educational Foundations at University of Eldoret

KU Don publishes in the DZUWA 2020 edition

DZUWA is an editorially independent Publication of the African Women Human Rights Defenders Platform. It is supported by Urgent Action Fund Africa as a space filled with story-telling, sharing and learning about holistic security, healing, wellness and radical care for and by African women, transgender and gender non-conforming human rights defenders and their communities to draw inspiration of the rich resilience of their movements. Ms. Anne Mwiti of the department of Fine Art published in the DZUWA publication. Ms. Mwiti is a lecturer in the Department of Fine Arts. She is an artist and researcher focusing on crisis, conflict and culture.



Ms. Anne Mwiti's work as featured in DZUWA



School of Business annual International Business Research and Industrial Conference (IBRIC)

The school of Business has been in the forefront in realigning the School's mission with the University's on enhancing research capacity and productivity among scholars. To achieve this, the School held its First International Business Research and Industrial Conference (IBRIC) on June 20th – 21st 2019 in the North Coast Beach Hotel, Mombasa. A total of 181 presentations were made with 150 participants, drawn from academia and industry – local and international, attending the conference.

Following the tremendous success of the 1st IBRIC 2019, which was brought about largely by the strategic positioning of the school as well as the commitment by the school leadership and staff, the School of Business embarked on a mission to have the 2nd IBRIC 2020 in June 2020 at the North Coast Beach Hotel, Mombasa but due to the Covid-19 pandemic, a decision was made to have the 2nd IBRIC 2020 virtually on 3rd and 4th December, 2020, the first virtual conference held by Kenyatta

University. The 2nd IBRIC conference whose theme was "Academia-Industry Partnerships for Competitive Innovations and Global Sustainable Development" was anchored in seven sub themes namely: Technological innovations, disruptive technologies, and industrialization, Strategic capabilities, industrial responsiveness and socio-economic development; Corporate governance, financial markets and global convergence; Emerging marketing trends, blue economy and entrepreneurship; Changing landscape in human resource management; Data analytics, forensic and Cyber Security and collaborative project management and global value chain.

The virtual conference was officially opened by the Vice Chancellor, Kenyatta University, Prof. Paul K. Wainaina represented by Prof. F. Q. Gravenir, DVC. Research, Innovation and Outreach.

The 2nd IBRIC, conference sought to provide an interdisciplinary platform for policy makers, key industry players,

researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the fields of Business Management and innovation through the conference podium and refereed publications. The conference further provided opportunities for academia to receive informal in-depth feedback from the industry through discussions and to enable them to establish contact with professionals in other countries and institutions.

The conference attracted an audience of about 160 delegates including: Industry players, experts who have conducted rigorous studies, or have developed innovative business management solutions for business and economic growth, or implemented effective large-scale projects, were invited to join the plenary and breakout sessions; international and local delegates. The conference was aired live on KUTV and all Kenyatta University social media handles with an audience of over 20,000 followers.

Some of the **key note speakers** included the following:



Prof. Vincent O. Onyvera PhD, ISAK 2 Registrar, Research, Innovation and Outreach, Kenyatta University



Mohammad Saeed, Ph.D.



CPA Edwin Makori, Chief Executive Officer – ICPAK



Mr. Geoffrey Odundo, Chief Executive Nairobi Securities Exchange Plc



Fred Gituku Human Resource Manager Vivo Energy

Dr. Eric Lewa Katana From Kenya School Of Revenue Administration Mombasa



Dr. Eric Balan – B. Eng., MBA, Phd Econ. PMP (USA), CCIA(Malaysia (Universiti Tun Abdul Razak, Malaysia)



Mrs. Jacqueline Mugo Executive Director/CEO, FKE.



Caroline Wanjeri Kihara CEO KCB Foundation



Loise Wangui – Head of Regulatory Affairs, Nairobi Securities Exchange (NSE)

Sponsors:



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MOBILITY/ VISITING SCHOLARS/ FELLOWSHIPS

Dr. Muthoka Mutie's **fellowship experience at Bayreuth Academy of Advanced African Studies**



Dr. Muthoka Mutie of the Department of Literature, Linguistics and Foreign languages was a post-doctoral international fellow of the Africa Multiple Cluster of Excellence at the Bayreuth Academy of Advanced African Studies from January 1st, 2020 to March 2nd, 2020. Funded through the Excellence Strategy of Germany's federal and state governments, the aim of the Africa Multiple Cluster of Excellence is to reconfigure African studies at the conceptual and the structural levels.

As part of this fellowship group, Dr. Mutie's focus was on (re)configuring the Africanness in African literary studies. The project was pushed by the enduring disputes surrounding African literary studies' inability to spearhead an African identity that emanates from Africa's ethos, philosophies,

and socio-cultural environment. The lack of a clear authentic African voice in the African studies today has made it difficult for African literary studies to tell the African story, except, of course, for disfranchised and disparate voices on decolonisation (East Africa and West Africa, the trauma of apartheid (in Southern Africa), and the silence that characterises the Maghreb North.

Essentially only the history of Europe exists in Africa today, the rest, as it was argued years back is darkness, and darkness is not a subject of history. African literary studies vied as a heavily contested field, is characterised by many coexisting and sometimes contradictory ways of conceptualising and studying Africa. This is attributed to the earlier anthropological, sociological, and historical writings on Africa which not only

sent out the wrong knowledge about Africa but also laid a wrong foundation that has produced decades of tussle and academic combat.

Attempts to dissolve "Africa" as a research object by exclusively focusing on global connections, or, on the contrary, to establish an essential "Africanness" by decoupling African knowledge production from hegemonic Western epistemologies, are two of the more extreme positions on this spectrum. These positions underscore the fact that African studies are facing profound conceptual questions, highlighting power imbalances that continue to characterise knowledge production with a focus on Africa, raising the question of who studies Africa, and how.



My staff exchange experience

Dr. Job Omagwa



Dept. of Accounting and Finance

with the teaching department.

The university's unique academic culture is noteworthy: lectures are mainly conducted via electronic platform; 45 minute lectures are punctuated with a 5-7 minutes break; students revise by memorizing academic materials loudly on the corridors and stairs; there is strictness in class attendance; lecture presentations are often emailed to students about 1 week in advance; strict adherence to a single course text is observed; lectures would strictly start and end on time; 1st and 2nd year students are compelled to recite theories and concepts daily (at Mao Square from 5 45am to 6 15am); undergraduate units are often examined via True/False and Multiple choice questions; Chinese students would often not ask questions or clarifications during lectures to limit interruptions;

professors/lecturers have sole discretion in determining the structure, scope and weighting of end-semester examinations; postgraduate students pursue thesis writing concurrently with coursework; postgraduate units are often examined via class discussions and presentations.

Besides lectures, I presented a talk (to students and staff) on Kenyan Culture and Economics. Dr. Muchemi and I often met about 15 Kenyan Students on Scholarship and advised them on social challenges, career choices and job opportunities once they completed their studies. I equally visited the Ancient City of QingZhou (the trip was organized by the University) to appreciate Chinese artifacts and antiques. We noted that university is gradually embracing a multinational student and staff population".

My staff exchange programme at Shandong Normal University, PR China (from 14/10/2019 to 03/01/2020) was quite fulfilling and enriching. Dr. A. Muchemi and I was accommodated at Hanlin Hotel (at Main Campus) where several other foreign faculties were hosted. I facilitated two Undergraduate classes and a PhD class (for 10 Pakistan Students on Scholarship). The School of Business assigned me a Teaching Assistant to help translate my lectures from English to Chinese in addition to linking me

Job Shadowing at Hochschule Bonn Rhein Sieg University of Applied Sciences



Dr. Okech at the University campus facilities

was job shadowing in a multicultural workplace.

He taught Business Presentation Skills and Intercultural Communication. He also observed other lecturers in their classrooms and contributed by sharing the Kenyan perspective and teaching approaches. He also attended administrative meetings to learn administrative aspects of the institution and networked with faculty from the University of Cape Coast in Ghana.

Highlights of the learning areas:

- Use of didactical approaches such as flipped classroom, project-based learning, simulation and case studies.
- Use of online tools such as LMS, Wikis, Adobe Connect, Zoom, and plagscan.
- Virtual Exchange projects with international students.
- Basic German language classes. A1.1

Other benefits:

- Talked about KU and available faculty/student mobility programs. Consequently, work is in progress to develop collaborations between

the University and the School of Education.

- Working in a multicultural workplace provided new skills in multicultural communication and etiquette. The strictly regimented German way of doing things is a good eye opener and takeaway!
- The exchange has opened new frontiers for future collaborations in research and mobility of both staff and students, including virtual exchanges, participation in international conferences and faculty training.

Discussions are ongoing to begin a virtual exchange programme with KU and Universities in Germany, Portugal, Ghana and Canada. This programme will expose faculty and students to multicultural diversity and increase students' employability.



Visiting Scholar at University of Agder, Norway

Dr. Teresa Mwoma had an opportunity to visit University of Agder Department of Sociology in February 2020 as a visiting scholar.

The purpose of the visit was to explore opportunities for collaboration in research focusing on migration and how it affects early childhood education. During the visit, Dr. Mwoma gave a lecture to Masters Students on children's safety and security in preschools in informal settlement. She also shared her research findings in a seminar organized for faculty members on caregiving practices among pastoralists' communities in Kenya.

During the visit, Dr. Mwoma also had an opportunity to meet with faculty members from the Kindergarten Teacher education, with whom they are exploring opportunity of having exchange program for students and members of staff for the two universities. She also had an opportunity to visit the university Kindergarten which is used by student teachers as their lab school. Below are pictures for the visit.



Left: Dr. Mwoma giving a lecture to Masters Students at University of Agder Norway.

During the visit, Dr. Mwoma gave a lecture to Masters Students on children's safety and security in preschools in informal settlement.



Left: Dr. Mwoma in UiA Kindergarten. Right: Dr. Mwoma and Eric former KU student and currently PhD student at UiA pose for a picture with Manager UiA Kindergarten during her visit to the Kindergarten serving the university community

Research Stay at Technische Hochschule Ingolstadt - THI (Technical University of Ingolstadt) in Germany

Following the successful completion of the first phase of DAAD sponsored project on Network of Excellence for German Model for Universities of Applied Sciences in 2018-2019 that involved 7 universities in Kenya (including Kenyatta University), a second phase on Network of Excellence for Universities of Applied Sciences on Applied Teaching and Research at the Institute of New Energy Systems (INES) at THI University started for the period 2019-2020. This phase was also funded by DAAD. The major activities for the second phase include:

- Short-term scholarships for guest lecturers at THI (1-3 months),
- Short-term stays for joint research activities at THI (up to 3 months),
- A group workshop at THI,
- Networking activities with (potential) industry partners as well as
- A regional conference on applied research in Renewable Energy in Kenya

The research division at Technische Hochschule (THI) has three (3) institutes, namely:

- Centre of Automotive Research on Integrated Safety Systems (CARISSMA)
- Institute for Innovative Mobility (IIMo)
- Institute of new Energy Systems (InES)

The Institutes cut across faculties, i.e. they are ad-hoc and composition depends on the focus of the research project. Research Administration supports an application for project funds, both from government and industry. The support includes costing/budgets for projects (activities, materials, etc) and final accounting/ reporting. There is close working relationship between academia and industries. Industries propose research problems and fund universities to carry research.

The Institute of New Energy Systems of THI University has 5 Professors and 25 researchers who undertake applied research in the following areas:

- Industrial Energy Systems
- Energy Systems Technology
- Domestic Energy Systems

During my research stay at InES I was assigned to the Domestic Energy Systems

and had the opportunity to participate in the following ongoing projects:

1. Pathway to Renewable Energy Off-grid Community Energy for Development (PROCEED) – This is a joint project involving 3 Universities in Germany and one industrial partner with 5 work packages. The project looks at the social, economic and technical aspects in the implementation of a solar mini-grid system in Namibia.



Eng. Elias Ako
Dept. of Energy Technology

On this project, I am taking part in the development of optimization approaches for the design of new renewable energy system on the solar mini-grid based in Namibia. This was done using MATLAB/ Simulink. I have also had the opportunity to learn CARNOT (Conventional and Renewable eEnergy systems OpTimization Block set tool), a simulation software that works with MATLAB.

2. Design and in-depth evaluation of a cost effective optimized large area flat plate solar collector for central heating. This is a project funded by the German Federal Ministry for Economic Affairs and Energy. This project has 4 industrial partners. The project aims at increasing efficiency of solar thermal collectors through 3D CFD modelling and optimization of various parameters using ANSYS software.

3. Optimization of Biogas- PV Hybrid Plant for Deterministic Grid Power Production. The project aims at optimizing. The project aims at (i) improvement of existing of modelling approaches for the investigation of interactive operation of biogas and PV power plants through design of an optimization algorithm. (ii) To develop a predictive control system for biogas plants to respond to short term fluctuations in PV power generation. (iii) Concept validation on a commercial biogas plant.

For the above projects, I have also managed to participate in virtual quarterly progress meeting with the project partners and associated lab works.



Photo Courtesy of pngwing.com

Staff exchange visit



A team of four members of teaching staff from the School of Creative and Performing Arts, Film and Media Studies traveled to Poland and Germany from the 1st October to 1st December 2020 on a Cultural Exchange programme under the “Transcultural Perspectives in Art and Art Education” (TPAAE) project realized within the European Commission funded Marie Skłodowska-Curie Actions Research and Innovation Staff Exchange, Horizon2020 (MSCA-RISE H2020).

Representing the four departments in the School, the four members of staff were: (a) Prof. John Mugubi - Dean and Associate Professor, Department of Communication, Media, Film and Theatre Studies, (b) Dr. Mercy Wanduara - Department of Fashion Design and Marketing, (c) Dr. Priscilla Gitonga - Department of Music and Dance and (d) Anne Mwiti - Department of Fine Art and Design.

The Kenyatta University team visited

and interacted with members of staff and students at the host institution, the Academy of Arts in Szczecin. Visits were made to the individual four departments: (a) Painting, (b) Media Art (c) Design and (d) Music. The members of staff were assigned classes to teach, mostly online and also facilitated several workshops and symposia; presenting several academic papers. Thanks to the Pandemic, the team also benchmarked on how certain aspects of practical based art courses were handled through the online Platform.

The Kenyatta University team visited a number of Art galleries within Szczecin, Poland and Berlin, Germany. The team also visited the National Museum in Szczecin. During these visits, the Kenyatta University team learned a lot about the history of Polish and European Art and how to make the Creative Arts grow from the social dynamics of Art education. How to conceptualise the Creative Arts around an entrepreneurial lead and target audience was a major focus of the exchange visit.



Dr. Priscilla Gitonga, Ms. Anne Mwiti, Dr. Mercy Wanduara and Prof. John Mugubi together with their Polish and German counterparts during their visits to the Art galleries within Szczecin, Poland and Berlin, Germany



My mobility experience at University of Cape Coast, Ghana

I was awarded a mobility scholarship under the ACADEMY project; African Trans-Regional Cooperation through Academic Mobility (ACADEMY) is part of the Intra Africa Academic Mobility Scheme, which favors the exchange between higher education institutions in the different African countries. The project seeks to challenge issues such as gender equality, job shortage, poverty, environmental sustainability and higher education quality. ACADEMY helps knowledge and culture exchange through offering support for Masters, Doctoral and short research, teaching and administrative visits between the consortium partners. The consortium partners include University de Tlemcen (coordinating university), University of Cape Coast, Ghana, Kenyatta University, University of Ibadan, Nigeria and University of KwaZulu-Natal, South Africa. At Kenyatta University the project is coordinated by Prof. Chris Shisanya in the Department of Geography.

I visited the University of Cape Coast, Ghana in March 2020 and was attached to the Directorate of Research, Innovation and Consultancy (DRIC). After settling in and meeting with the DRIC team a schedule of activities was jointly prepared for the period. This was kickstart by a presentation of

the KU research ecosystem that was well received; equally the DRIC team also presented their research ecosystem which I got to experience firsthand. Both institutions have an almost similar research agenda and landscape; the DRIC team appreciated the well-established research processes at KU strengthened by various policy documents and a solid structure which they were keen to adopt. I participated in the day to day administration activities in the research directorate which also included accompanying various teams to check on researchers' field work activities.

Strengths/takeaways

- Staff complement that included research fellows
- Active inaugural lecture tradition
- UCC Scholar tool that provides real time data on their research output, allows for monitoring and evaluation as well as informs decision making.
- Yearly action plan for the team that is reviewed quarterly with monthly reports expected



The Cultural experience



It was not all work although I did not get to visit various touristic sites due to COVID-19, I got a glimpse into the history and culture of Cape Coast and Ghana by large. I visited the birthplace of Kwame Nkrumah's Convention People's Party in Salt pond. I also got to learn of the history of the Fante people and how they came to settle in their present home in Mankessim under the leadership of three legendary leaders with magical powers Oburumankoma (whale), Odapagyan (eagle), and Oson (elephant) Oburumankoma the whale is supposed to portray how the Fante were brave fisher-folks; Odapagyan the eagle speaks of Fante aerial ability and Oson the elephant symbolizes Fante land dominance.

I also visited Takoradi an industrial and commercial centre as well as the capital of the Western Region.

I enjoyed the colourfulness brought about by the African cloth (kitenge) that the Ghanaians proudly wear which is also worn as official attire, the vibrancy in colour all around did not give room to any dull moments, equally worn with pride

Ms. V. Tindi together with a KU MSc. Students Rogers Rono also under the ACADEMY project



Ms Tindi at Saltport the birthplace of the Convention People's Party



Fufu served with groundnut soup



Banku served with okra soup

My deepest gratitude goes to the ACADEMY Project for availing this opportunity, the UCC team for creating a home away from home, for the valuable lessons and insights and overall enriching experience. To KU for granting me the permission to undertake the mobility experience.



Tuo Zaafi served with goat meat.



Did I mention I partook in fufu pounding...

KU to host **Cohort 2 of the East African Community Scholarships**

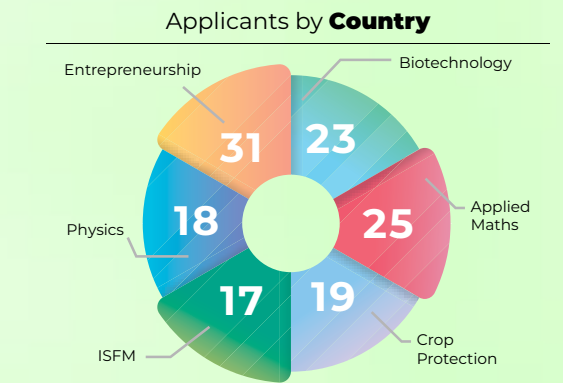
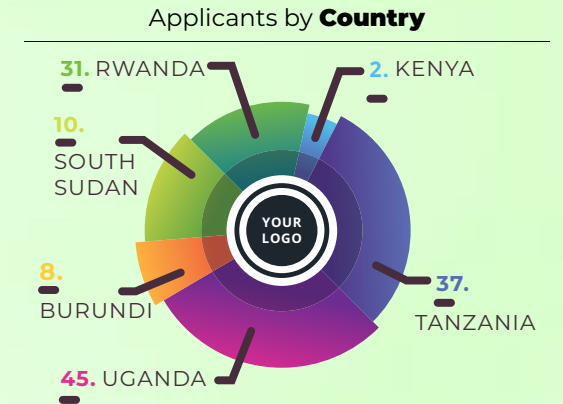


Kenyatta University has been chosen by the Inter-University Council for East Africa (IUCEA) to host cohort 2 of the EAC Masters Scholarship Programme. The programme is in the areas of applied mathematics, biotechnology, crop protection (plant pathology), integrated soil fertility management, entrepreneurship and physics.

The Programme that commenced in 2018 is supported by the German Development Bank-KfW and coordinated by the Inter-University Council for East Africa (IUCEA) on behalf of the participating universities in the region. The EAC has more than 170 million citizens with diverse cultural identities in the 6 member states of Rwanda, the United Republic of Tanzania, Burundi,

Kenya, South Sudan and Uganda.

Being a fast growing regional economic block, the EAC recognizes the importance of investing in education to create future change agents who identify themselves with the integration agenda of the EAC and are willing to share economic and development-oriented expert knowledge. Kenyatta University was selected to host the EAC masters scholarship programme due to its uniqueness in providing high quality programmes that are globally competitive. The Vice-Chancellor assured the IUCE secretariat that the university will create a conducive learning environment to enable the students undertake and complete their studies within the acceptable timeframe. The outlook of the applications was as follows





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**STUDENTS
CORNER**

CABI Awadees



Center for Agriculture and Bioscience international (CABI) is an international not-for-profit organisation that works to improve people's lives worldwide by solving problems in agriculture and the environment. CABI's work is delivered through dedicated teams and key partners in 49 countries across the globe. With over 11 centres across the globe including in Nairobi Kenya. Two Masters students in the School of Agriculture and Enterprise Development Ms. Berice Imbayi and Mr. Geoffrey Nyapom were supported by CABI to undertake their research projects which focus on plant health by management invasive pest through cost effective and environmental friendly methods.



Seeking cost effective and environmental friendly solutions to **fruit flies menace**



Ms. Imbayi at the laboratory above and Mr. Nyapom beneficiaries of research grant from CABI

Horticultural crops contribute significantly to agricultural production globally and are characterized by a large diversity of crop species, high returns per unit area, high nutritional value and high potential for income generation compared to other types of crops. Fruit flies are highly destructive insects that severely threaten fruits and vegetables production globally. There are approximately 4000 known species of fruit flies worldwide, of which 200 species are invasive causing damage fruits and vegetables. A good number of the Invasive

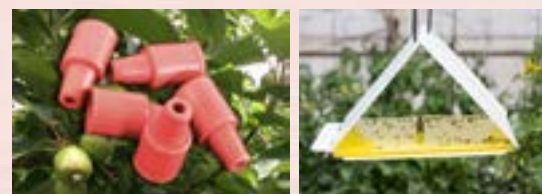
pumpkins (29%) and cucumber (40%). Most farmers use synthetic chemical pesticides to control the fruit flies which are costly, harmful to our health, environment and other beneficial organisms. Furthermore, insecticides are ineffective since the destructive larvae is inside the fruit pulp and pupation occurs in the soil, hence are protected from pesticides.

Alternative effective and sustainable pest control strategies are necessary. Ms. Imbayi under the guidance of her supervisors will investigate the use of commercially

species are spread across Africa causing losses ranging from 30%-80% to crops. Female fruit flies damage fruits by the puncturing the fruits to lay eggs and larvae feeding inside fruits. The larval stage causes about 40% damage on squash, sweet guard (30%), mangoes (40-75%), watermelon (30%),

available pheromone lures as a convenient and fast method for detecting, monitoring and controlling fruit flies. The study will be carried out in Murang'a, Kirinyaga and Embu Counties in Kenya where cucurbits and mangoes are produced, 6 farms will be selected and three types of Pheromone traps installed.

Data on fruit flies will be collected fortnightly, brought to the laboratory for separation, counting and identification under a dissecting microscope. It is expected that the results will provide a better understanding of the extent of loss caused by fruit flies on mango and cucurbit farms and demonstrate the effectiveness of the lures as a tool for monitoring pest population and predicting loss and as a tool in decision making for control measures.



Red rubber septa pheromone lure which is a type of insect trap that uses pheromones to lure insects



Direct estimation of **Maize yield loss caused by Fall armyworm in Kenya**

Maize is the major food crop in Kenya, where 2.4 million tons are produced yearly for over 28.6 million people (85 kg/person). With the population rapidly growing and the resulting pressure on land every crop produce counts. However, the fall armyworm (FAW) is posing a threat on food security.

Fall armyworm a pest native to America arrived in Africa in 2016, when it was first reported in Western Africa from where it spread rapidly. By 2019, it was found in most of sub-Saharan Africa threatening food security.

Various management options have been adopted in Kenya, including use of climate adapted push and pull, use of natural enemies as well as use of insecticides. However, control and management measures of the pest infestation on maize may work successfully once the levels of attack are assessed and the pest status known. Several studies have tried to estimate the impact of FAW, in particular the crop losses that it causes. The first study, based on surveys, estimated that FAW had the potential to cause maize yield losses from 0.8 to 1 tonnes/ha (47.3% of crop damage), if left uncontrolled. To address this gap, actual maize yield assessment is essential for establishment of proper integrated pest management strategies.

Mr. Nyapom will seek to explore a more precise method of estimating crop losses which will be through direct measurement of the actual losses. Crop loss is simply the

difference between the potential yield (yield that would have been obtained in the absence of the pest) and the actual yield. This study will be carried out in five major maize growing agro ecologies in Kenya. Half of each fields will be protected against FAW using a systemic insecticide, and the other half left for natural infestation, and the comparison of yields gives an estimate of crop loss. Mr. Nyapom hopes to provide the first experimental and statistical yield loss assessment in maize attributable to FAW infestation in Kenya as well as an estimate of the potential impact of the maize losses due to FAW, paving way to the effective design of integrated pest management options for FAW, leading to greater food security easing global burden for crop loss.

Fall armyworm a pest native to America arrived in Africa in 2016, when it was first reported in Western Africa from where it spread rapidly. By 2019, it was found in most of sub-Saharan Africa threatening food security.

KU supervisors, Dr. Ruth Kahuthia-Gathu and Dr. Everlyne Samita together with CIMMYT Supervisor and Mr. Nyapom (second right) during a field visit trial in Kiboko. The trial, maize yield loss caused by fall armyworm in Kenya is currently being conducted in major maize growing areas in Kenya.





Research and Innovation News

Office of the Deputy Vice Chancellor
(Research, Innovation and Outreach)

P.O. Box 43844-00100

Nairobi, Kenya

Tel: +254 20 870 Ext: 3026

email: dvc-rio@ku.ac.ke

www.ku.ac.ke

<http://research.ku.ac.ke/index.php/en/>