University Fundamental Statements

Vision Statement
The Vision of Kenyatta University is to be a dynamic, inclusive and competitive centre of excellence in teaching, learning, research and service to humanity.

Mission Statement
The Mission of Kenyatta University is to provide quality education and training, promote scholarship, service, innovation and creativity and inculcate moral values for sustainable individual and societal development.

Identity Statement
Kenyatta University is a community of scholars committed to the generation and dissemination of knowledge and cultivation of wisdom for the welfare of society.

Core Values
Truth, Creativity, Excellence, Self Reliance, Innovation, Equal Opportunity, Corporate Governance, Institutional Culture, Competitiveness, Academic Freedom and Respect for Diversity

Philosophy Statement
Sensitivity and responsiveness to societal needs and the right of every person to knowledge.

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Welcome to the second issue of the Kenyatta University Research and Innovation publication. This publication is in line with one of the core mandates of Kenyatta University, that is research and community service.

This bi-annual publication continues to highlight the efforts and achievements of the Kenyatta University members of faculty and students. It is an effort to showcase the quality of research and the pride that Kenyatta University has in its colleagues’ and students’ accomplishments. The publication covers a wide range of research activities and stories including but not limited to publications, grants and profiles of the faculty. The Editorial team is open to any suggestions and looks forward to the contributions of the University’s scholars, researchers and students.

This publication highlights topical news related to the following areas among others:

i. Ongoing research and innovation news
ii. Research partnerships and collaborations
iii. Research grants, awards and honors
iv. Kenyatta University outstanding researches at different levels of their careers
v. Events and activities
vi. Strategies by the Division of RIO to strengthen and catalyze the university’s research agenda

Since the Division’s establishment about 3 years ago, a primary pursuit has been the identification of the most suitable administrative structure that is capable of delivering its mandates and maximize research and innovation productivity. Like the engine of a car, the structure is still being tinkered with and fine-tuned in order to give it the required boost and maximize its efficiency and effectiveness. As we do this, we acknowledge the support of the University Council and Management Board without which we would not have gone this far.

As a University supported in major part by the National Treasury and by extension the taxpayer, we have a duty not only to produce high quality human capital but also undertake research relevant to the needs of the environment whose results are disseminated for uptake by the public and private sectors of the country. The University is well aware that as an academic and research community, we have an important contribution to make towards the realization of Kenya Vision 2030 and the global sustainable development goals.

The Division has developed and adopted a multi-pronged strategy in an effort to deliver on its mandates. Firstly, a robust capacity building programme targeting academic staff and postgraduate students has been prepared and being rolled out. Using experienced facilitators from diverse backgrounds, the intensive training sessions will focus on grant proposal writing, management of funded projects, research data handling, scientific writing, designing powerpoint presentations, access and use of e-resources, etc. Secondly, the Division continues to update its webpage with research relevant information for staff and postgraduate students including upcoming conferences, internal & external opportunities, where to publish by disciplines, spin-off companies, etc. Thirdly, the Division provides the opportunity through its Directorate of Research Support for a second opinion on all proposals prior to submission to funder in order to make them competitive. These efforts have started yielding good results!

The ultimate intention is to establish, support and advance an environment that supports and catalyzes research and innovative activity of the highest calibre. We invite you to explore our research site www.ku.ac.ke/research.

Enjoy reading the newsletter.

Prof. Frederick Gravenir
Deputy Vice-Chancellor
Research, Innovation and Outreach

Message from the DVC - RIO

Editorial Committee:
Prof. Vincent Onywera; PhD, ISAK 2
Ms. Violet Tindi
Ms. Sylvia Anzagi
Ms. Martha Wainaina

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Division’s strategy to strengthen the University’s research backbone

The University has set the wheels rolling on sustaining a research-intensive environment to support staff and students to enable them effectively respond to the fundamental changes in the research environment both in Kenya and globally. Among its strategies is the conduct of research capacity building workshops for postgraduate students and staff members which will run throughout the year. The trainings were informed by surveys conducted prior which revealed the capacity gaps that need to be addressed to ensure high quality and impactful research. The trainings area of focus will include; grant proposal writing, project management, data handling and analysis, scientific paper writing, preparing scientific posters and preparing effective powerpoint presentation among others. The Division’s objective in the short and long-term is increased research grant awards for both faculty and students. The trainings also aim at empowering the researchers with capacity to generate better research outputs evidenced by quality research communication and publications. Additionally the University approved a framework of research governance policies and procedures to be enforced by the Division of Research, Innovation and Outreach (RIO) and the Kenyatta University Research Advisory Board (URAB). These are among the structures and systems the Division’s has been working to put in place since its existence aimed at enhancing the University’s research ecosystem by ensuring research activities are grounded on firm foundation and carried out with the highest standards of integrity. These policies apply to all any member of staff who undertakes research either individually or collaboratively.

Research News

Research and Innovation Policy

This policy aims at ensuring that the entire research process is pursued with high integrity. The policy puts emphasis on provision of research opportunities, quality and ethics in research and innovation, intellectual property rights, efficiency and effectiveness in coordination and management of research and innovation at the University.

Policy on Development and Operationalization of School Research Journals

Research is about sharing ones findings with the community so that they may benefit from the new knowledge that has been discovered or generated and Kenyatta University is committed to this idea as espoused in our philosophy statement. This policy therefore aims at supporting research by regulating the establishment and operationalization of research journals by various schools in the university.

Policy on Motivating Staff to Conduct Research

The policy aims to encourage staff members to become more productive in research and innovation related activities. Its focus is based on providing a framework and establishing incentives that will influence the academic staff to actively engage and spend significant time in research thus creating an enduring culture in the university.

Preparation and Presentation of Inaugural Lectures

Over the years, the university has made delivery of inaugural lectures a central part of its academic calendar to showcase and celebrate the new professors before an audience of the members of the university community and the general public. The policy gives general principles and guidelines to be considered in the preparation process as well as the delivery of the inaugural lectures by full professors.
Kenya Vision 2030

Enya’s Vision 2030 emphasizes quality education and training in Science, Technology and Innovation (STI) in order to make Kenya a middle-income country by 2030 and to improve competitiveness regionally and globally. A key constraint to attainment of the STI goals has been the significant low numbers of qualified teaching staff in the fields of engineering and applied sciences. This has adversely affected the capacity in institutions of higher learning to fill existing vacancies in these fields.

The Government of Kenya therefore, secured a loan from African Development Bank (AFDB) to Support Enhancement of Quality and Relevance in Higher Education Science and Technology (HEST). HEST is a five year project aimed at contributing to Kenya’s human capital skills development capacity building particularly in education, science and technology, to respond to labor market demands and spur productivity nationally. The HEST project objective is to improve equitable access, quality and relevance of skills training and research leading to job creation and self-employment.

Kenya University through the School of Pure and Applied Sciences was competitively selected to be a consultant in the HEST project, to strengthen and improve its capacity to train and mentor a large number of postgraduate students in applied sciences. Kenyatta University was selected to train 31 PhDs and 23 MSc’s in Chemistry and Physics.

This training component will support capacity building of existing staff in engineering and applied sciences at Masters and PhD levels. Training approach will be conducted through a blended training mode that utilizes the local teaching faculty, industry experts and faculty from collaborating institutions from within Africa and abroad that are already supporting the faculties as part-time lecturers and supervisors. PhD students will carry out research that is relevant to the vision 2030 key sectors. The existing partnership with the Kenya Private Sector Alliance will be explored to enhance meaningful industrial attachments, research and development of incubation centers. The HEST project will not only provide the requisite numbers but also enhance quality of the graduates in these fields. To promote women participation in science and engineering, a deliberate effort was made to ensure that a third of the total number of trainees are women.

Paul Karanja, MSc. Student, performing an experiment on aflatoxin resistant peanut varieties at the Plant Transformation Laboratory.

HEST is a five year project aimed at contributing to Kenya’s human capital skills development capacity building particularly in education, science and technology, to respond to labor market demands and spur productivity nationally.
The French Embassy in Kenya has partnered with Kenyatta University to develop a solar power Centre of Excellence; this follows the award of a 350,000 Euro grant by the French government and instrumental technical support from Urbasolar, a France-based company. The objective of the Centre of Excellence is to facilitate the transfer of renewable energy (specifically solar power) technology, to train, educate and develop the skills of students, technicians and local practitioners in the solar sector, create jobs and aid the growth of the solar industry in Kenya. The Project has three components;

- Development of a 100 KwP Photovoltaic pilot plant at the University’s main campus (currently underway) using innovative technologies including a one axis tracker system moving on an East-West orientation (the first of its kind in East Africa).

- Development of a Center of Excellence (CoE) in the main Campus, in collaboration with the French Institute on Solar Energy (INES) and the French Ministry of Education. The center will focus on training, research and development on the solar industry to students and practitioners locally and regionally. Courtesy of the MoU with the French Ministry of Education an expert in renewable energy has been identified and will be based in KU for 3 years to support the creation and delivery of a course curriculum on renewable energy for the KU CoE.

- Studying the feasibility of a commercial scale ground mounted photovoltaic solar power plant for self-consumption.

Solar energy is fast gaining traction in the country especially at the rural areas as it provides many with a cost effective, environmentally friendly alternative. Interestingly, despite solar technology being in Kenya from the early 70s its potential is yet to be fully tapped, the benefits of solar energy though enormous have been limited at the small scale mostly within households and driven by the private sector. The notable/minor challenges impairing solar energy uptake include lack of technical expertise, uncertain market and regulatory conditions, high initial installation cost among others. However, the main roadblocks are the unfamiliarity and the common preconceptions that are still too widely present in the minds of the Kenyan population and economic players.

The centre of excellence is expected to help in addressing the issues that the solar industry faces by facilitating and stimulating technological and business innovations in order to develop products and services that solve unique energy challenges in the country and in the region. The main goal of the project is therefore to demonstrate the technical, economic, social, and environmental pertinence of photovoltaic technology, while directly addressing student populations who are considered to be the most receptive, most likely to drive a positive image of the photovoltaic industry, and to put technical knowledge and know-how to work in this field.

Through partnerships with government agencies, the private sector, civil society groups and other relevant stakeholders that are already being pursued, the centre is expected to become an important player in the industry and help in the achievement of the national renewable energy goals and aspirations.

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Two KU researchers are part of a 10 team collaborative research project led by the University of Southampton aiming to help improve food and water security for people in sub-Saharan Africa. The project titled: Sustainable water and food security in drylands of sub-Saharan Africa has been awarded £5 million by the Global Challenges Research Fund.
Prof. Vincent Onywera from the Department of Recreation Management and Exercise Science has received a 3 year (2017 to 2020) collaborative development and research grant from the Ministry of Foreign Affairs of the Finish Government.

Prof. Mikael Fogelholm from the Department of Food and Environmental Sciences, University of Helsinki, Finland is co-leader in the 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 project is a collaborative venture between Kenyatta University, Kenya; University of Helsinki and Haaga-Helia University of Applied Sciences both from Finland. The overarching goal of this project is to establish a vibrant platform for facilitating collaboration, disseminating information, enhancing scientific and pedagogical interaction, and for strengthening the training of new researchers and key actors in public health arena. The project objectives will entail enhancing research capacity in the field of healthy lifestyle and obesity in Kenya, within the context of a rapid nutrition and physical activity transition; improving/creating a multi-disciplinary, higher education curriculum in the area of obesity, lifestyle and health promotion and develop an international, multi-disciplinary team of researchers with the combined expertise required to address the complex nature of Non-Communicable Diseases (NCDs) in Kenya within the context of a country undergoing a nutrition and physical activity transition.

The National Academy of Sciences (USA) through the United States Agency for International Development (USAID) has approved a project titled: Sustainable Utilization and Conservation of Wild Sorghum Genetic Resources for Resistance to the Parasitic Plant Striga witchweed.

The project led by Dr. Steven Runo of Biochemistry and Biotechnology Department aims to develop a technology platform for harnessing and conserving wild sorghum as a source material for providing resistance to Striga – a parasitic plant that attaches to roots of cereal crops and sucks out their nutrients causing severe stunting and death. The project is an extension of an earlier project conducted by MSc students Dorothy Mbuvi and Hildah Kithinji that discovered new sources of Striga resistance from wild sorghum and published in the Journal of Frontiers in Plant Sciences. Using genomics Dr. Runo’s research group has further identified genetic components – only present in wild sorghum that induced a strong protection against Striga, underscoring the rich diversity of wild sorghum. In the new project, Dr. Runo’s research team intends to disseminate evidence that wild sorghum are important sources of Striga resistance to a network of stakeholders comprising farmers, breeders, seed experts, agronomists, and agricultural extension experts in order to influence the action of developing demand driven varieties. Subsequently, influencing policies on conservation of wild sorghum by demonstrating the potential of wild sorghum to grow in Striga infested fields.

The project aims to improve the capacity of the higher education sub-sector in the Federal Government of Somali to positively impact on economic growth and poverty reduction. The conflict in Somali significantly affected its Education sector and resources constrains in the post-conflict fragile context have led to the actors in the sector directing available resources to the expansion of primary and secondary education. The project will support activities leading to (i) development of policy framework for higher education and the regulatory environment; (ii) institutional level improvements for improved standards, accreditation and recognition of qualification; and (iii) capacity improvements in curriculum development, research, teaching and networking. Consequently, higher education institutions will be better regulated, in a position to offer good quality education and produce qualifications that are portable. The project will engage the private sector to improve the relevance of academic curriculum to reflect the needs of the local and regional labour market.

Prof. Godfrey Mse, from the Department of Education Management, Policy and Curriculum Studies has been awarded a development grant of £2,000,000 by the European Commission for a project titled: Somali Higher Education Development Support (SHEDS) project.
The National implementing entity NEMA is working together with Kenya Forestry Research Institute (KEFRI) and KU under the lead of Dr. Mary Baaru from the department of Environmental Studies and Community Development in implementing a project titled Implementation of Integrated Programme to Build Resilience to Climate Change Mechanisms and Adaptive Capabilities of Vulnerable Communities in Kenya.

The Project is funded by the The Adaptation Fund established by the Kyoto Protocol. The project seeks to enhance resilience and adaptive capacity to climate change by developing and implementing integrated adaptive mechanisms to increase community livelihood resilience to climate change in order to increase food security and environmental management. Kenya comprises 83% of arid and semi-arid land and has an economy and livelihoods that are heavily reliant on rain-fed agriculture, which is in turn vulnerable to extreme droughts aggravated by climate change and variability.

Dr. John Muriuki of Environmental Education Department was awarded a grant from the United Nations University which in collaboration with Kenyatta University is to run Education for Sustainable Development Workshop in Africa (ESDA-SUD)-Sustainable Urban Development Workshop with the theme titled ‘Critical Issues for Sustainable Urban Development and Livelihoods Support’.

The workshops aim to enrich the ESDA Master’s Programs through holding sustainable development workshops as well as to publish books which can serve as standard textbooks for their programs. The workshops will mainly focus on urban water, sanitation and energy towards sustainability, innovations, entrepreneurship for sustainable urban livelihoods and developments and urban sustainability that is roles of governance and citizenry participation.

The African Development Bank Japan Trust Fund has provided funding in support of one year project titled: Promotion of Knowledge Exchange, Creation and Sharing between Africa and Asia in Support of Africa’s Sustainable Development”.

The project being led by Dr. Jackline Nyere of the department of Educational Management, Policy and Curriculum Studies is under the Education for Sustainable Development in Africa (ESDA) Consortium. The project will facilitate the consortium’s major initiative of implementation of the New Generation Researchers program that seeks to promote problem-solving research to generate learning materials as well as to create needed space for students’ field work. The program has a long term agenda that will see structures in place to support knowledge exchange between Africa and Asia through collaborative research of young researchers from African and Asian universities.

US Civilian Research & Development Foundation (CRDF) has awarded a grant in support of Training Workshops on Chemical Security and Safety Vulnerability under the stewardship of the Lead trainer Dr. Mildred Nawiri of department of Chemistry.

Laboratory technicians from chemistry, biochemistry, microbiology, agriculture, pharmacy and medical laboratories will be taken through the training that aims to convey international best practices for safe and secure chemical risk management. The training programs will raise awareness of chemical security concepts and implementation strategies, guide participants in developing standard operating procedures for their laboratories and implementing chemical security best practices as well as identify chemical threats and develop mechanisms for reporting suspicious activity and threats.
Prof. Grace Wamue-Ngare from the Department of Gender Development Studies was awarded a grant from the Norwegian Church Aid to fund a project titled ‘Assessment of Tamar Campaign in the DRC’. The project is being undertaken in collaboration with Claremont Graduate University under the lead of Prof. Karen Jo Torjesen.

The project aims to assess the processes that led to changes in attitudes and behaviors related to gender based violence in the eastern DRC namely launch of the campaign, mobilization of churches, participation in Reflect Circles, transitions from contextual bible study to action plans; and to measure the impact of Reflect Circles on participants, churches and mosques, and communities. The overarching goal of the project is to provide quantitative and qualitative documentation on the kinds and degree of social change created by the 250 Reflect Circles implemented by the campaign, and also understand how and why, so that the assessment will contribute to development of materials to educate the general public on the processes and results of the Tamar Campaign.
### Multidisciplinary Proposals Shortlisted by Institution

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| Total | 159 | 100 |

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### Kenyatta University’s Internal Performance

#### Phd Proposals Submitted & Awarded

- **Awarded**: 40 (52%)
- **Unsuccessful**: 32 (44%)

#### Phd Awards by Discipline

- **Agriculture**: 12.5%
- **Biological Sciences**: 15%
- **Chemistry**: 15%
- **Environmental Sciences**: 15%
- **Health**: 12.5%
- **Mathematics**: 10%
- **Physics**: 10%
- **Social Scienct**: 10%

#### Masters Proposals Submitted & Awarded

- **Awarded**: 24 (51%)
- **Unsuccessful**: 23 (49%)
Breakfast consumption is associated with several health benefits including cognitive and academic performance, unfortunately many people skip this important meal missing out on the benefits associated with it. Prof. Kimiywe echos that many dietary guidelines recommend daily consumption of a nutrient dense breakfast containing 15-25 percent of one’s nutrient (vitamins and minerals) and energy requirement. Having been in a fast during the night, breakfast re-fuels the body with energy and nutrients to kick-start the day in all age groups, especially in children and adolescents as an individual is more likely to consume the recommended daily nutrients unlike when breakfast is skipped.

In a white paper she co-authored Prof. Kimiywe points out that a typical Kenyan breakfast entails bread/bread toast with or without spread and tea, boiled porridge and tea and fried egg (once a week). These breakfasts are usually not nutritious because food groups like fruits, vegetables and fats are missing. Consequently, the Kenyan breakfasts will not sufficiently deliver important nutrients, such as fibre, vitamin A, C and folic acid, which increases the risk of malnutrition.

Championing the Importance of a Nutritious Breakfast for Kenyan Children.

Prof. Judith Kimiywe, Associate Professor, Department of Foods, Nutrition and Dietetics.

“Starting the day with a nutritious breakfast will help children to get the nutrients they need, and therefore we need to make breakfast a habit for all”.

Contents of a good Breakfast

Eat breakfast as a king lunch as a prince and dinner as a pauper might be an old adage but its relevance on health and well being cannot be overstated. Prof. Judith Kimiywe of Department of Food Nutrition Dietetics working together with stakeholders at MoH, Unilever and KICD under the Good Breakfast Alliance aims to improve the health and well being and education of children in Kenya by promoting the importance of a nutritious breakfast every day.
The early years of a child’s development provide a window of opportunity to lay a strong foundation for a child’s life. During this period children make leaps in physical, motor, social-emotional, cognitive and language development. Neuroscience demonstrates the critical impact of early experiences in brain development. Providing proper health, nutrition and early stimulation in the early years facilitate brain development and children’s well-being. The benefits of early childhood care and education programmes therefore contribute to good child development outcomes, setting the foundation for lifelong learning and helps in monitoring the health and nutritional status of children in the early years of development.

In ensuring that there is a link between university and service provision in early childhood, the Department of Early Childhood Studies is currently collaborating with national and international organizations by hosting the Early Childhood Development Network for Kenya (ECDNeK). ECDNeK was established out of the realization that there was a gap in the coordination of various organizations and institutions engaged in Early Childhood Development service provision, capacity development, research and advocacy in Kenya. This was alongside the timely opportunity for implementation of the devolved functions as well as enhanced engagement in the global development agenda being the start of the implementation of the Sustainable Development Goals.


Dr. Teresa Mwoma of Department of Early Childhood is the National Coordinator and Head of Secretariat of ECD Network for Kenya. The Network brings together both state and non-state actors providing services in early childhood development in health, nutrition, education, protection, capacity building and research. The founding member organizations include: Kenyatta University, World Vision Kenya, Aga Khan Foundation East Africa, Save the Children International, Child Fund Kenya, PATH International, Research Triangle Institute International, Parenting in Africa Network, KANCO, International Child Resource Institute, Little Rock Inclusive Early Childhood Centre, Kidogo Early Years, and Build Africa Kenya. UNICEF Kenya provides technical support to the Network. ECDNeK is an affiliate of the Africa ECD Network.

From left: Dr. Rachel Nyamai, Ministry of Health; Dr. Pablo Stanspery, UNICEF Regional Office; Dr. Teresa Mwoma, National Coordinator ECD Network for Kenya and Senior Lecturer Department of ECS, Honourable Kisoi Munyao, Member, Education Committee National Assembly, Honourable Abdi Aziz Shonay, Member, Education Committee National Assembly and Mr. Darius Mogaka, Director, Policy and Partnership Ministry of Education.

Kenyatta University has partnered with DAAD since 2015 through its In-Region scholarship program for training of university teaching staff and other staff in the public sector through postgraduate training. Specifically, DAAD has supported students undertaking both Msc and PhD in Biotechnology, Renewable Energy and Environmental Planning and Management and Masters in Integrated Watershed Management, a special program that is a regional center of excellence in watershed management.

During the certificate award ceremony, DAAD was represented by Dr Ruth Fuchs, Head of Monitoring based in Bonn, Germany and Mr. Bonface Nyaga the Programme Officer. In her remarks, Dr. Fuchs lauded Kenyatta University for the excellent administration and management of the scholarship program and specifically pointed out the strong support that the university management has accorded the students. She advised the students to be on the lookout for the many opportunities available including short summer trainings and conducting short-term research in a German University of their choice. On his part, the Programme Officer, Mr. Nyaga expressed satisfaction with the overall running of the programme and the great cooperation from the students despite some having language barriers. He further informed the students on the need to renew their scholarship award in time and provided tips on career opportunities.

The cohort consisted of 15 students from different universities in Kenya and 6 students from Tanzania, Rwanda, Somali (2), Benin and Ethiopia. In their remarks the students expressed their excitement for the opportunity to study in Kenya and specifically at Kenyatta University and shared their reasons for choosing KU ranging from the excellent and modern facilities, quality of teaching staff and the high reputation of the University. The handover of the certificates was witnessed by among others Dr. Maina Mwangi (Director, Research Support and coordinator of the DAAD program) and Prof. Joy Obando (coordinator of the Integrated Watershed Management program).
Africa is generally viewed as a victim of brain drain, however, there are some countries in the continent such as South Africa that are playing a vital and increasing role in receiving the world’s top higher education students, particularly from within the continent. Nevertheless, there remains very limited empirical research on this significant trend. “Internationalization at home” is a discussion gaining prominence, with universities around the continent being urged to put in place measures to support continental mobility of scholars, as well as to create a conducive environment to attract international students.

‘Academic Student Mobility in Africa: The Case of Kenya’, is a seven country case study supported by the National Research Foundation (NRF) of South Africa, being spearheaded by Dr. Jackline Nyerere of the department of Educational Management, Policy and Curriculum Studies. The Kenya case study is focusing on two universities, Kenyatta University, and United States International University –Africa representing public and private universities respectively. The two universities have been identified due to their positive profiles as hosts of a sizeable number of international students in public and private universities respectively. Using both quantitative and qualitative approaches, the project seeks to answer the following questions:

- Why did international students choose to study in Kenya, and more specifically, the institution they are currently attending?
- What differences are there in their reasons for attending based on their region and country of origin, and degree program?
- What are international students’ academic experiences and future plans and how do they vary by region and country of origin and degree program?

The findings from this study will provide much needed yet lacking information for African countries to better receive and prepare international students for academic success in their host institutions.

Research by: Dr. Jackline Nyerere
Department of Education Management, Policy and Curriculum Studies

Research by: Dr. Rekha Sharma
Department of Zoological Sciences, Kenyatta University

Project Financed by: KU Vice-Chancellor’s Research Grant

Project Title: Anthropogenic Impact on Mountain Catfish (Amphilius uranoscopus-pfeffer) with Reference to Management and Conservation along Sagana and Thiego Streams in Kenya.

With many rivers constantly modified in flow and physical environment habitat relationship of streams fishes form a basis for developing predictive models for conserving species.

The focus on the stargazer mountain catfish was informed by the sparse information available on its life history though fundamental in identification and assessment of stock as well as formulation of management strategies for its sustainable utilization.

The project adopted a participatory approach involving the local communities and government agencies in its activities including site selection and riparian restoration promotion, capacity building workshop were held with the aim of enhancing sustainability and scaling up of proper land use practices as well as enhanced riverine fisheries production. The project revealed existing gaps in policies concerning riverine fisheries utilization and management, the findings will inform the Kenya Forest Service and Fisheries department activities including protection of the catchment region as well as other water towers in the country and control of number of licensed fishermen along the Sagana River especially.

The scientific research community will benefit from the findings allowing scientists to re-examine the potential threats and strategies that can be adopted in management of the water catchment areas going forth.
The department of Medical Physiology has established thrombosis research laboratory, located on first floor of the dean of medicine building complex. The establishment of the lab was informed by the limited data available on bleeding disorders in the country, despite the great advances in detection and diagnosis of bleeding disorders the country still faces challenges in diagnosis of such disorders which are silent killers. Further research output on coagulation studies from Kenya are sparse with most being case series that suggest the existence of a bigger problem that require detailed investigations. The lab seeks to facilitate research activities that will provide information relating to thrombosis and extent of the disorders. It also aims at providing the much needed trained experts who are currently thinly spread. So far the facility has trained several individuals and facilitated research projects on ‘Effects of crystalloid solutions on the Human coagulation system’. ‘Effects of Acute Physical Activity in Obese Subjects on Coagulation: Its Relation to Plasma Lactate and Lipid Levels’ among others. The Laboratory is equipped by the following:

1. Chrono-Log Platelet Aggregometer (LTA) that allows performance of platelet function tests such as shape change, release reaction and maximal aggregation,
2. Thromboelastograph that allows coagulation testing of whole blood, plasma, platelets. It shows time of onset of clot formation, rate of clot fibrin buildup, maximal clot strength (MA) and fibrinolysis.
3. ELISA Reader, which has absorbance, chromogenic, chemoluscence as well as fluorogenic function allowing the performance of lab tests relevant to clinical situations such as vWF Ag, vWF Frets activity, vWF collagen and ADAMTS 13.

The lab has also received a donation of Scanning Electron Microscope from Belgium that will enable studying of morphology of clots as well as interaction with cellular elements.
Organic Waste Recycled to Produce Chicken Feed

Recycled kitchen waste an important ingredient to production of chicken and fish meal. Adan Mohammed, the C.E.O of Ecodudu has devised a way to ensure the kitchen waste does not go unutilized. The waste is recycled to produce chicken feed, fish meal (dudumeal) and organic fertilizer. Ecodudu which solves waste food and nutrient shortage by up-cycling discarded food to create sustainable and locally produced animal feed and natural fertilizer is one of the emerging Startups at the Chandaria Business Innovation and Incubation Centre. The Startup has recently won the Kenya National Innovation Agency Award, under the Agriculture category. Ecodudu won Kshs. 1,000,000 towards his business venture. The company recycles 0.5 tonnes of organic waste every day, and supplies to farmers in the surrounding Nairobi environments with its operations based in Ruiru.

Coming second runners up, under renewable energy/environment category for the same award is Chemolex Company limited which won Ksh 500,000. Chemolex which deals with provision of services in renewable energy and agricultural technologies is co-founded by James Ogola and Clifford Okoth.

Kenyatta University’s Innovation Roadmap

Kenyatta University aims at expanding innovation and entrepreneurship that leverages on quality education and research in order to contribute to the Africa’s socio economic development. The university has always been in a position to understand critical problems facing humanity more rapidly and is building effective solutions that scale and achieve impact especially those targeting the United Nations Sustainable Development Goals (SDGs). The University focuses its attention on problem-rich and solution-rich environments in order to resonate with day to day needs of humanity.

Scientific discoveries and technical advances provide countries with unparalleled opportunities for economic growth and improved social well-being. But the rapid increase in new scientific and technological knowledge only provides economic and social benefits when it is effectively exploited and leads to innovation and entrepreneurship.

Accelerating the transition from Discoveries to Production Kenyatta University realizes that innovation performance depends not only on how specific actors (e.g. enterprises, research institutes, universities) perform, but on how they interact with one another as elements of an innovation system, at local, national and international levels (Quadriple Helix). Towards this basis, and as clearly articulated as one of the major goals of Kenyatta University. The university is also keen on the establishment and advancement of “science of innovation” which is the systematic analysis of the factors shaping innovation and entrepreneurship outcomes through fundamental research and policy advocacy with diverse stakeholders and thought leaders. To this effect, Chandaria Business Innovation Incubation Centre has successfully engaged and is already implementing the following projects/programmes:

“The University focuses its attention on problem-rich and solution-rich environments in order to resonate with day to day needs of humanity.”
KU-HNU-DAAD Project

The project involves capacity building of lecturers and instructors who will later be instrumental in the contextualization of innovation and entrepreneurship into the respective school’s programmes.

Wadhwani Foundation

Wadhwani Foundation (WF) impacts economic development through ‘Job creation’ - Entrepreneurship & SME development (NEN); and ‘Job fulfilment’ - Skills and Vocational development. The National Entrepreneurship Network supported across countries by WF endeavours to support ‘job creation’ in East Africa. It purports to do this by mainstreaming entrepreneurship in education for national impact and by supporting start-ups and SMEs to grow their companies. To achieve this the Foundation seeks to enable the education and SME eco-system to function with higher relevance, support, knowledge and know-how so that thousands of young people can develop entrepreneurial skills able to leverage the opportunities in the region and SMEs get the necessary support and networks to grow their businesses competitively.

SAG-SEED Starter in Partnership with European Union’s Switch Africa Green and Social Enterprises for Economic Development

The SAG-SEED Starter promotes the incubation of new eco-enterprises. Setting up a business is both an exciting and challenging task: Turning an idea into a product or service customers actually want to buy, requires not only a deep-dive into the market, but also business skills and bringing together the right team and partners. Considering all aspect can be challenging, SEED seeks to support young teams of entrepreneurs with innovative ideas through the SAG-SEED Starter Months.

Watch out for the Africa Innovation Festival 2017 to take place in the weeks of 16-18th September 2017.

Dissemination and Uptake

Safety and Security in Preschools: A challenge in Informal Settlement

School safety is important in enhancing children’s learning. It is defined as measures put in place by staff, parents, learners and other stakeholders to minimize or eliminate risk conditions or threats that may cause accidents, bodily injury as well as emotional and psychological distress. Accidents if not prevented can cause disability or death, while emotional and psychological trauma can lead to lack of self-esteem leading to poor performance. Meaningful teaching and learning cannot therefore happen in an environment that is not safe and secure to both learners and staff.

Dr. Teresa Mwoma, presented findings of her study conducted in preschools in informal settlements of Nairobi City County, focusing on safety and security of children in preschools funded by the Vice Chancellor’s research grant 2015/2016. The study conducted in 54 preschools involving 54 head teachers/managers, 78 preschool teachers and four officers in education in Nairobi City County revealed that while the government has endeavored to come up with guidelines and minimum standards through various policies, preschools in informal settlements are experiencing a myriad of challenges that impact negatively on children’s learning among them; poor infrastructure, lack of play space and play equipment, congested classrooms and unfenced school compounds.

In view of these challenges, the study recommended the City County Government in collaboration with other stakeholders in early childhood should come up with model preschools in informal settlements to create conducive learning environments. Further, the study underscored the need for frequent inspection of these preschools to ensure that safety and security standards are observed and implemented as outlined in various government policy documents.

KU Researcher Investigates an Emerging Food-Borne Zoonosis in Kiambu County

Thika town has been reported as the highest consumer of pork among Kenyan urban area with pig production systems mainly with small holder commercial units fed on commercial feeds, semi intensive systems fed on swill and ag-ro-industry by-products and free range in the informal settlements. Some of these production systems are risk factors in the transmission of taeniasis/cysticercosis (Cysticercosis is a tissue infection caused by the young form of the pork tapeworm while Taeniasis is an intestinal infection caused by adult tapeworms) that pose a risk to public health. Humans acquire these intestinal tapeworms by eating raw or under-cooked meat from infected pigs which have not been adequately inspected prior to being sold for consumption.
Serious complications resulting from the infection include seizures, dementia psychiatric manifestations and headaches among other ailments. The increasing demand of pork meat is not restricted among the Kenyan urban areas but across the sub-Saharan Africa unfortunately knowledge regarding the disease causing tapeworm is scarce and in some areas is non-existent. In the Kenyan context, there is scarcity of data to show the prevalence and associated risk factors of. Dr. Purity Nguhiu from the Department of Animal Sciences lead a team of researchers in a study to investigate the prevalence and factors associated with taeniosis and porcine cysticercosis in Thika Sub County. The study was carried out through the monitoring of hospital-based data, small holder pig farmers and pig abattoir surveys.

The study sort to create awareness on the presence and incidences of the disease among pig farmers, input suppliers, pig meat traders and processors, meat inspectors and public health workers, and chart the way forward with regard to intervention measures that can be adopted by the county governments and other stakeholders. The study revealed that many of the farmers were largely unaware of the disease or the risk factors for its transmission or control, that some of the pig farming methods adopted by the farmers heightened the occurrence and transmission of the diseases causing tapeworms among pigs. These practices included poor pig housing, feeding of uncooked swill, free-range systems of rearing which leave the pigs to scavenge for food in areas characterized by open sewers and dumpsites. Awareness of the disease, its contributory factors and control measures was also low among the pig meat vendors and consumers who preferred their pork fried or roasted. Lastly, few cases of Cysticercosis were being captured in hospitals as few seek medical care.

In a stakeholder dissemination workshop held on the 29th of May, 2017 the research team shared and discussed their findings with the relevant stakeholders. Recommendations that resulted from the study which included;

- Training of pig farmers on good pig husbandry practices to reduce transmission as well as revenue from loss of the infected pigs
- Sensitization of the meat inspectors on the disease symptoms and need for increased vigilance to avoid compromising human health.
- Need to develop relevant training materials for use by both public health and animal health workers in creating awareness.
- The need to carry out public health education stressing the need to sought medical care firstly among the research participants who were affected by the disease and to the general public as well.
- A policy brief statement was shared with Kiambu County Government to facilitate the development of a policy to provide direction on the control of the disease in the area and in the long run lead to eradication of the disease as envisaged by World Health Organization (WHO) by 2030.

Events

Kenyatta University through the Division of Research, Innovation and Outreach of Research held an informative forum on publishing facilitated by Elsevier, one of the world class publishing firms, to help firm up and elaborate on all matters ‘publishing’.

The workshop was officially opened by the Deputy Vice Chancellor Research, Innovation and Outreach, Prof. Frederick Gravenir, in his speech he noted that it is important for researchers to churn out researches that are not only relevant and limited to the scientific community, but also impactful on the lives of common people and in effect, changing lives. Prof. Gravenir underscored the importance of re-dedication to research, innovation and publishing by engaging in creative research through investment in research and knowledge sharing. He reiterated that it is imperative researchers recognize and take up their role in contributing as African scientists in setting the global agenda and in attainment of Vision 2030.

‘It’s only when we discover and understand ourselves then will we be able to be power players in the global arena’.

Mr. Mohamed Khairy from Elsevier in his presentation titled ‘Introduction to Scholarly Publishing’ took the participants through the history of publishing, the role of the publishers, what to do to publish, how to choose the right journal to publish in, products offered at Elsevier and the various sites and tools, such as Mendeley and Elsevier Publishing Campus that can be useful to researchers in their publication journey.

The workshop also featured some of top researchers within the university such as Prof. Vincent Onyewa, Prof. Michael Gicheru and Dr. Lucy Joy Wachira who shared their experiences in publishing in refereed journals including what it takes to do so, which greatly enriched the whole workshop experience.
SASA Awards
Kenyatta University

Kenyatta University hosted the 1st Society for the Advancement of Science in Africa (SASA) award ceremony celebrating young researcher’s enthusiasm, commitment and absolute determination to forward their research findings.

Speaking at the event, the Acting Vice-Chancellor, Prof. Paul K. Wainaina indicated that a lot of emphasis is being put on research right from the national level, KU is equally keen to contribute by enriching the research environment. He applauded the initiative by SASA to facilitate the advancement of research and encouraged the possibility of incorporating other stakeholders such as funding organizations and the government into this noble initiative and encouraged members of staff to become members of SASA.

He also observed that it is important to recognize students abilities and their potential as this boosts their confidence and enthusiasm towards research. He lauded the organizers of the event and expressed appreciation to the SASA Executives and the entire organizing committee for giving young researchers an opportunity to objectify their research findings and going an extra mile to award them.

Among the awardees were students from KU, Mr. Joseph M. Ochieng and Ms. Martha Odhiambo who received a Silver Award USD. 1500 and Gold Award USD 3,000 respectively. The acting Vice Chancellor, Prof. Paul K. Wainaina and Prof. Mike Boit were feted with honorary awards for the facilitation and support of the SASA agenda.

SASA is a not-for-profit international association of scientists, academic institutions, research institutions, government agencies, philanthropists and funding agencies that serve to advocate, educate, lead and guide advancement of science on the African continent and link such advancement with the wider global scientific knowledge society.

Bio-security Sensitization Workshop for KU Researchers and Technicians

Kenyatta University was privileged to be one of the two universities in Kenya to hold a one-day workshop on Biosafety and Biosecurity Awareness. The event was organized by the National Commission for Science, Technology and Innovation (NACOSTI), Commission for University Education (CUE), Danish Center for Biosecurity and Bio-preparedness and facilitated by the Division of Research, Innovation and Outreach. The workshop brought together faculty members, laboratory technicians and students with the aim of raising awareness about biosafety and share recent development, emerging trends, standards as well as concerns and prevalence of biological threats and measures to combat them.

The fast paced research in life sciences has seen significant production of knowledge and technologies that have had immense positive impact on the health and well-being of human beings, animals and the environment. Conversely, some discoveries have been ill exploited leading to biological weapons. Analysts from the Centre of Biosecurity and Bio-preparedness facilitating the workshop highlighted on the current status of biosecurity in Kenya, responsible science and biosecurity, dual-use technology and what to control. The workshop was seen as an opportunity for KU scientists to be enabled to conduct research responsibly and to support others in doing the same. The facilitators stressed on the following strategies as key to increasing awareness:

- Being aware and assessing your own research
- Refraining from research where the potential for harm is disproportionate to the potential benefits Modifying research and/or publications to reduce risks
- Reporting and documenting risks
- Knowing and using guidelines and safe practices
- Being alert and raising concerns (also about others’ research)
- Protecting sensitive material and data
- Training others and serve as a role model.

The participants expressed gratitude for the insights obtained from the workshop and committed to taking their role of being role models and advancing awareness and fostering responsible behavior among peers as well as in emerging scientists seriously. The University was further privileged to receive book donations from the Danish Center for Biosecurity and Bio-preparedness which were distributed to the library and to select departments.
Visiting Scholars

Dr. Macharia Mwangi

Dr. Macharia Mwangi—a lecturer in the Department of Literature—was awarded the All Africa House Fellowship offered by the University of Cape Town. The annual fellowship targets young and mid-career Africa-based academics to be hosted at Cape Town University for three months.

The scholars are expected to work on a research topic and prepare a complete research paper for publication. They do this with the support of hosts who they identify before being awarded the fellowship. Dr. Mwangi has been involved in a workshop organized by his host, Dr. Christopher Ouma, at the Department of English and Literature at the UCT and is expected to engage with UCT’s intellectual community about his work through presentation of seminars at the All African House and in his host faculty. The fellowship ran from 15th March and ends on 15th June 2017.

Prof. Fernando Quevedo, Kenyatta University was honoured to host Prof. Fernando Quevedo, Director, International Centre of Theoretical Physics (ICTP), Italy. Prof. Quevedo presented a lecture on ‘String Theory, Particle Physics and Cosmology’, among the highlights of his lecture were the greatest recent discoveries in relation to cosmology, fluctuation of cosmic microwave background, The outstanding problems including cosmological challenges and the role of string theory in addressing them.

He noted whereas Cosmology was an exotic subject a few years back now it is an exciting field that is drawing attention. Prof. Quevedo took the opportunity to highlight how ICTP is fostering the growth and advanced of studies and research in physical and mathematical sciences, especially in support of excellence in developing countries in areas such as Chemo-physics, Energy and Sustainability, Statistical physics, Computing sciences, Quantitative life science among others. He also pointed out that the Centre is keen to develop high-level scientific programs in line with the needs of the developing countries and to conduct research at the highest international standards and maintain a conducive environment of scientific inquiry for the entire ICTP community. His visit aimed at strengthening collaboration between the Centre and KU with the aim of promoting science. He encouraged post-graduate students and staff to apply for the various capacity building opportunities offered by the Centre.
Dr. Klara Dolos

Klara Dolos a researcher from the institute of Geography and Geoecology at the Karlsruhe Institute of Technology (KIT) Germany, visited the University as a visiting lecturer in the department of Geography.

Dr. Dolos’ expertise are in the areas of vegetation geography, macroecology and climate impact research. She is strongly interested in the influence of natural and anthropogenic factors on ecosystems in the light of sustainable supply with local ecosystem goods, nature conservation and biodiversity. Her methodological tools portfolio includes advanced statistical analysis and modeling, dynamic modeling as well as vegetation surveys. During her visit Dr. Dolos conducted a training workshop on Data Analysis with ‘R’ which is an integrated suite of software facilities for data manipulation, calculation and graphical display.

Carnegie Africa Fellows Visit to Kenyatta University

Dr. Susan Sande

Susan Sande of the Department of Zoological Sciences is currently involved in teaching and research at Wageningen University and Research (WUR) in the Netherlands as a guest scientist.

Dr. Sande has been instrumental in catalysing a formal collaboration between the marine animal ecology chair-group of WUR and KU’s Department of Zoological Sciences which houses the bachelor degree in Marine Sciences. The collaboration involves an already funded reef restoration program at Shimoni in the Kenyan Coast and development of students exchange between KU and WUR for future marine research. Plans are at an advanced stage to involve Kenya Wildlife Services in a tri-partisan collaboration for further research grant proposals, targeting other marine areas of Kenya.

Dr. Joshua Muia from the Department of Medicine, Division of Hematology, Washington University in St. Louis was hosted by Dr. Gordon Ogweno of the Department of Medical Physiology under Diaspora Fellowship Program.
During the stay Dr. Muia sort to facilitate Research Collaborations on Assays of Hemostatic Proteins ADAMTS13 and VWF and Strengthening of Medical Curriculum in Coagulation Biochemistry. The project aimed at laying a foundation for physician scientists/basic scientists training in blood coagulation, haemostasis and thrombosis through the newly created the Center of Excellence in Thrombosis and Haemostasis Research and Treatment; enhancing scientific communication among the faculty and trainees around research questions, review on writing competitive research grants, and training in how to write and get published; setting up an ADAMTS13 testing laboratory to screen and study patients with thrombotic microangiopathy and related disorders, the first in the sub-Saharan countries as well as catalyzing and facilitating the transfer of technology and accelerating national and international collaborations and links between institutions in the United States and Kenya by providing a multidisciplinary network of researchers between partner institutions.

Activities undertaken by Dr. Muia during his stay included, the development of curriculum for a graduate course in laboratory and clinical hemostasis and thrombosis, delivery of lectures on translational research and mentoring of faculty and graduate students in grant proposal writing and preparation of manuscripts for publications, review and improvement of the current curriculum especially the integration of teaching and research in laboratory-based courses. He also initiated and conducted practical sessions on ADAMTS13 assays in the newly formed Thrombosis Research Laboratory in the Department of Medical Physiology and carried out practical laboratory sessions in bleeding and blood coagulation disorders, specifically screening for thrombotic microangiopathy disorders using ADAMTS13 enzyme assays. Dr. Muia was also instrumental in development of proposals submitted to GSK Africa following their NCD Open Lab Call 2017, Intra-Africa Academic Mobility Scheme and International Society of Thrombosis and Haemostasis. Upon his return to the US Dr. Muia sent out a consignment of consumables and reagents for new Thrombosis Research Laboratory.

Dr. Fred Muyia Nafukho

Dr. Fred Muyia Nafukho, Professor of Educational Administration and Human Resource Development and Associate Dean for Faculty Affairs, College of Education and Human Development at Texas A&M University a visiting Carnegie African Diaspora Fellow was hosted by the Division of Research, Innovation and Outreach. Dr. Nafukho's work at Kenyatta University involved working with leaders and faculty to develop a strategic plan for the Division of Research, Innovation and Outreach based on Kenyatta University’s Strategic and Vision Plan (2016-2026). The plan sets out to increase faculty productivity indicators including a rise in citations and H-Index of KU faculty, increase in grants awards among others.
Dr. Nafukho together with Dr. Kay Wijekumar also from Texas A&M University facilitated a workshop on Reading, Comprehension and Writing in Maths, Science and Social Sciences that focused on moving from knowledge revolution era to ideas era. Participants discussed key ideas in reading and learning including Comparisons, Signaling words, Problem and Solution, Cause and Effect. Dr. Nafukho in his presentation that focused on the role of the university in the “Ideas” era noted that critical thinking and brain power were key to resolving the grand challenges that face humanity. He pointed out the importance of interdisciplinary research in addressing the grand challenges that we face as a nation and the world at large.

Dr. Wijekumar observed that her online tutoring program funded by the US Department of Education is grounded in five main ideas including comparisons, cause and effect, problem and solution. She discussed the use of matrices and structure system to help learners comprehend what they read. The two scholars also visited the Kenya Institute of Curriculum Development (KICD) and discussed the virtual reading and comprehension tutoring system developed by Dr. Wijekumar and possibility of its incorporation into Kenyan schools.

Curriculum Development

Dr. Nafukho worked with faculty colleagues in the department of Education Policy, Management and Curriculum Studies to revise their curricular. He was instrumental in the development of draft programs in four areas including Master of Education in Higher Education Leadership and Management (MEHL- New) with Dr. Jackline Nyerere, Master of Education in Student Affairs in Higher Education (SAHE-New), Master of Education in Education Policy and Organization Leadership (EPOL- Revised Educational Planning and Economics), and PhD in Education Policy and Organization Leadership (EPOL – Revised Educational Planning and Economics). The drafts have been discussed by Kenyatta University colleagues and revisions are ongoing. Dr. Nafukho pointed out that the revised curricular makes a major departure from the previous one since students will be expected to participate in integrated learning activities and to draw linkages across disciplines to respond to complex problems. The revised programs will encourage the application of distinct realms within social science to address pressing leadership and policy problems via coursework, collaboration with local school leaders, analysis of social change, business and industry. The revised curricular will require graduate students to take a proposal development class and a literature review course which will expose them to the canons of research writing with a strong emphasis on integrating complimentary disciplines.

Dr. Nafukho, who is a member of Kenyatta University Press Editorial Board (KUPEB) also worked with his colleagues at KU on innovative strategies to make the publishing unit of the press functional.