

Mount Kenya



University



Directorate of Research and Development

RESEARCH AND INNOVATION BULLETIN

ISSUE No. 4: 2015

Directorate of Research and Development

**RESEARCH & INNOVATION
BULLETIN**

Issue No. 4: 2015



Foreword

Prof. Stanley Waudu, PhD
Vice-Chancellor
Mount Kenya University

Science, technology and innovation (STI) are expected to play a pivotal role in Kenya's Vision 2030 development blue print. Mount Kenya University is therefore committed to play its part in complementing government efforts in socio-economic transformation of our society. Indeed, the University reckons that a knowledge-driven economy and not a resource-based one will be key in this endeavour, largely informed by research and innovation. The University therefore continues to invest in research and innovation activities, and in the last fiscal year, we allocated Ksh. 50 million towards the same. The funds were invested towards equipping the Research Centre, establishing and running the Enterprise Academy, the first-ever in the region for youth empowerment geared towards job and wealth creation. The funds were also used for organizing a National Water Summit in Turkana county, funding research and innovation projects, supporting dissemination activities through facilitating faculty to publish in peer-refereed journals and to participate in both local and international conferences. The University has further organized capacity building workshops and community outreach activities. The University will continue supporting STI activities as an important catalyst towards socio-economic transformation of our society.

Prof. Stanley Waudu, PhD
Vice-Chancellor
Mount Kenya University

Message from the Deputy Vice-Chancellor, Academic and Research Affairs

Ms. Bibianne Waiganjo
Deputy Vice-Chancellor, Academic & Research Affairs
Mount Kenya University



Mount Kenya University has continued to invest in its faculty through the Vice-Chancellor Research and Innovation Grant. To date, this internal grant has benefited over 60 faculty members who are currently undertaking research in various disciplines. The University has spent Ksh. 12 million in the last one year to build capacity of researchers in the University through facilitating training workshops and conferences. During the academic year 2013/2014, the University injected Ksh. 22 million into the grant scheme that saw the number of beneficiaries double. The University faculty continue to attract funding from external donors, including the Association of Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), Kenya Agricultural Productivity and Agribusiness Project (KAPAP), Third World Academic Sciences (TWAS), National Commission for Science, Technology and Innovation (NACOSTI), International Society for Infectious Diseases (ISID), Government of Japan, and International Foundation for Science (IFS). Being cognizant of the fact that the next battlefield of academia in Kenya and the region will be about quality training largely driven by research and innovation activities, the Division of Academic and Research Affairs will continue to invest in the University's research agenda through incremental funding of research activities and building strategic research partnerships.

Ms Bibianne Waiganjo
Deputy Vice-Chancellor, Academic & Research Affairs
Mount Kenya University

Message from the Director, Research and Development

Francis W. Muregi, PhD
Director, Research & Development
Mount Kenya University



The Directorate of Research & Development has continued to steer the research agenda of the University on a firm course aided by various road map documents including the University Research Policy, Vice-Chancellor Research and Innovation Grant Policy as well as the University Research Strategic Plan. In the last two years, efforts were geared towards enhancing the research capacity for staff members through training workshops, facilitation to attend conferences and to publish in peer-reviewed journals. This has led to an increase in the number of quality research outputs.

The Directorate has redefined the next level of the University research agenda to be "product-and service-centred". The research team is thus in the process of actualizing Research Centre with this agenda in mind. On Incubation Programme, the University's one-of-a-kind Enterprise Academy which was hosted by the Directorate has yielded great success. The pioneer apprentices of the "Academy 2014" have not only established their enterprises but also continued to create jobs in line with the ultimate object of the programme, which is job and wealth creation. The Research team's commitment in driving the University research agenda to higher heights remain firm in order to make Mount Kenya University a research institution of choice in the region.

Thank you.

Francis W. Muregi, PhD
Director, Research & Development
Mount Kenya University

Message from the Deputy Director, Research and Development

Peter G. Kirira, PhD
Deputy Director, Research & Development
Mount Kenya University



Kenya has certainly made incredible strides in the expansion of post-secondary education in the last decade. To date, there are more than 60 Universities in a Country with an estimated population of slightly over 40 million people. Unfortunately, that phenomenal growth has not been matched with growth in research and innovation. The government has certainly demonstrated goodwill through increasing research and innovation funding to about Ksh. 400 million per annum. This amount is expected to grow to about 2% of Gross Domestic Product (GDP). Establishment of Mount Kenya University Research Enterprise & Innovation Development Centre (REIDC) is a clear demonstration of how receptive the University Management is to local and national agenda. In addition, the Research Division has been facilitated to hold several public lectures and trainings in Research Methods, Intellectual Property Rights, and Biosafety issues. At the Research Centre, current efforts are geared towards implementation of the programmes envisioned in the University Research Strategic Plan (2012-2018). To this end, installation of key research equipment including Atomic Absorption Spectrophotometer, Gas Chromatography machine and High Performance Liquid Chromatography are expected to support high quality research by the faculty and postgraduate students. The year 2015 certainly is the year of implementation. Projects on Non-Communicable Diseases, Natural Products and Pharmaceutical Research have been initiated. There have been concerted efforts to develop several grant proposals to raise requisite funds for the implementation of the research agenda. I see Mount Kenya University Research Centre providing solutions to problems in health, water & sanitation as well as initiating development of at least one product in 2015.

Peter G. Kirira, PhD
Deputy Director, Research and Development
Mount Kenya University

Directorate of Research and Development

Research Directorate Vision

To be a leader in addressing community socio-economic needs through research and innovation.

Mission

To provide leadership in research and innovation for social and economic empowerment.

Mandate

- a) Research
- b) Innovation
- c) Community Outreach

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RESEARCH

1.0 Enhancing Research and Innovation Capacity

1.1.1 Installation of Research Equipment at the Research Centre

Equipment installation was followed by training workshop for staff members in the Directorate of Research and Development.



Selected installed equipment: a- Automated High Pressure Liquid Chromatography, b-Ultraviolet-Visible Spectrophotometer, c-Gas Chromatography, d-Fourier Transform Infrared Spectroscopy, e-Atomic Absorption Spectrophotometer, f-Refrigerated Centrifuge, g-Dissecting Microscope, h-Haemocytometer, i-Thermocycler (PCR)

The Directorate of Research and Development through its 2013-2018 strategic plan aims at utilizing the installed equipment not only for teaching/training purposes but also offering analytical services to individuals, other institutions of higher learning, research institutions and companies at a cost.

1.1.2 Internal and External Research Grants

1.1.2.1 Vice-Chancellor's Research and Innovation Grant

A total of 27 MKU researchers and innovators received 2013-2014 Vice-Chancellor's research and innovation grant in form of seed capital. Researchers committed awarded money to their respective research projects. By the end of 2014, many beneficiaries presented their progress reports as indicated in the table 1.

Table 1: Vice-Chancellor's Research and Innovation Grant Awardees 2013-2014

No.	Name of Principal Investigator	Project Title
1.	Mr John Kamau	An Empirical Investigation into the Effect of Users Training on the Adoption of Desktop Open Sources Software by University Students in Kenya
2.	Dr Karonjo & Ms Nancy Maingi	Factors Determining uptake of Long term Acting Family Planning Methods among Women of Reproductive Age in Thika District, Kenya
3.	Prof. Suleiman Mbaruk	Passive and Active Epidemiological Studies within Kiambu County
4.	Ms Agnes Kalenywa	Effects of Mastery Learning on Students' Academic Achievement and Motivation in Secondary School Chemistry Performance in Nairobi County
5.	Ms Esther Muita	Microbial Occupation and Lifestyle determinant of Cervical Cancer among Women in Nakuru County
6.	Ms Irene Khavere & Maryanne Mureithi	Knowledge, Attitude and Practice of Family Planning among the Women of Reproductive age group (15-49) Living in the Streets in Nakuru County
7.	Ms Ruth Nyambura	Adornment among the Samburu: A historical Perspective
8.	Dr Jane Karonjo & Mr Samuel Mungai	Knowledge, Attitude and Practices in reproductive health among the youth in MKU
9.	Ms Catherine Kiarie	Factors Affecting Adoption of ICT by Small and Medium Enterprises in accessing Information in the Hospitality industry in Kenya
10.	Ms Elena Mwai	Factors Influencing Adoption of Telecommunication in Kenya: A case study of Agricultural Research Institute in Kiambu and Murang'a Counties
11.	Mr Jerad Onyancha	Evaluation of Antitumor Activity of Selected Kenya Medicinal Plants used ethnomedically to manage Cancer in Mount Kenya Region
12.	Mr Njagi Kelvin Murithi & Kennedy Waweru Njeru	Sustainable e-waste management in Kenya - Role of Kenyan Universities
13.	Mr Gilbert Nyakundi Okebiro	The Sustainability of Free Primary Education in the Education System and its Implication in Turkana Society
14.	Dr Peter Gachangaga	A study to determine the Minimum Lethal dose Pathogenesis and Pathology from Indomethacin when used as a Rat Poison
15.	Dr Peter Kirira & Dr Francis Muregi	Synthesis and Antimalarial Evaluation of Quinolone-trioxane and Quinolone-chemo Sensitizer Hybrid drugs
16.	Dr Pamela Ochieng	Impact Analysis on Gender Mainstreaming in Higher Education in Kenya
17.	Ms Anne Kamunge	Development of Nutrient Supplement comprising algae and aloe

18.	Ms Christine Njuguna	Gender Influence on the Seeking of Counseling Help among Students in Public Secondary Schools in Kiambu county
19.	Mr Joseph Gakuru & Mithamo Maina	Design of computer numerical controller (CNC)
20.	Mr Peter Wanjala	Open Information Technology Infrastructure Sharing Framework. The case study of mobile service providers in Kenya
21.	Mr Benson Njoroge Wanjiru	Relationship between English Language proficiency and Mathematics Performance among the Secondary School Students in 12 Kahuro Districts, Murang'a County
22.	Mr Ronald Tombe	Micro-blogging for Back Channel in Strengthening Asynchronous Learning in Formal Learning
23.	Ms Veronica Mutua & Mbenena Musau	Evaluation of Financial Management Practices and Skills Needed and their Impact on the Principals and Administrative Performance in Public Primary Teacher Training Colleges in Kenya
24.	Ms Anne Wanjiru Muiru	Relationship between Psychological aspects and their Impact on Suicide Attempts among the Public and Secondary School Students in Murang'a County.
25.	Mr Kennedy Muna Kuria	Molecular epidemiology of Human Respiratory Syncytial Virus in Kamukunji District, Kenya
26.	Mr John Michael Okoche	Plagiarism the Cancer of Education; A case study of Mount Kenya University
27.	Ms Alice Nguju	Towards e-Learning and Workforce Empowerment: Effectiveness of e-Learning Strategies in Secondary School Curriculum Implementation in Nairobi County, Kenya

1.1.2.2 External Research Grants

The Directorate of Research and Development has continued to solicit research funding from bilateral and multilateral donors to achieve their research agenda. Six researchers from MKU received external funding through their competitive proposals as indicated in table 2.

Table 2: External Research Grants, 2014

No.	Name of Principal Investigator	Project Title	Funding Agency	Amount Awarded (Kshs.)
1.	Mr Suleiman Chambea	Practices of Waqf in a Non-Muslim State: Experiences from Kenya Between 1060-12010	5 th Call NACOSTI	400,000
2.	Mr Alex Kiragu	The power derived power supplier	4 th Call NACOSTI	275,000
3.	Mr John Wachira Kamau	Adoption of desktop open software by University students in Kenya	5 th Call NACOSTI	300,000
4.	Mr Anne Moraa Ochiki	Management of Millennial Generation on Job Performance in Hospitality Industry: A case of the Boma Hotel in Nairobi, Kenya	5 th Call NACOSTI	150,000
5.	Mr Kennedy Kuria Muna	Determination of Biomphalaria pfeifferi proteins Expressing Immogenic Properties Against Schistosoma Mansoni: Strategy for Vaccine Development	5 th Call NACOSTI	120,000
6.	Prof. John Nderitu	Development of biopesticide-based IPM systems to reduce synthetic pesticide residues in vegetables for niche market access by small holder growers	RUFORUM	6,056,602
7.	Mr Dickson Mutua	A pressure Driven Water Engine	5 th Call NACOSTI	500,000

1.2 Selected Ongoing Research Projects

1.2.1 Fighting Cancer using Green Bullets

Cancer is an age-old disease. In fact, it is a class of over 200 diseases, characterized by abnormal proliferation of cells. The disease has been there for ages mostly in the Western world. In Africa, infectious diseases have for many years constituted the greatest healthcare burden. In the recent past, rise of cancer related cases in Kenya has left health practitioners worried since the country is still engaged in combating HIV/AIDS, malaria and other infectious diseases. Treatment of cancer either through a single drug or a combination of drugs is an expensive affair and only a few patients can afford.

The side effects of chemotherapy are also undesirable and effective cure is not guaranteed particularly when the disease is diagnosed at advanced stages. A sizeable number of cancer patients have therefore resorted to the use of herbal medicines. Plants have for a long time been used in the treatment and management of cancer. Some of the plants have been documented while many others are yet to be. In the recent past, there has been a surge of interest in the use of alternative medicine in Kenya. The study therefore seeks to identify and validate effective anticancer extracts from plant species selected.



Dr Peter Kirira with some of the tree species to be used as the green bullet against the killer cancer disease.

Dr Peter Kirira debarks the identified tree species being investigated for cancer treatment.



Dr Pamela Ochieng
Director, Nakuru campus

1.2.2 Impact Analysis on Gender Mainstreaming in Higher Education in Kenya

Introduction

Mainstreaming gender perspective is the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes in all areas and at all levels (UNESCO, 2010). Gender mainstreaming is important because it incorporates the fundamental principle that women and men experience different conditions and opportunities in life, have different interests and needs, and are affected in

different ways by social, political and economic processes, as a direct result of their gender.

The study was guided by the following objectives:

- To assess policy environment on gender main-streaming in higher education in Kenya.
- To establish institutional environment in relation to gender mainstreaming in higher education in Kenya.
- To determine critical policy indicators in gender mainstreaming in higher education in Kenya.

In a nutshell, the study findings revealed that there is an education sector policy in place and members are aware of the policy availability. The respondents were also aware of the education gender policy (100%).



Ms Elena Mwai
Lecturer, ICT Department

1.2.3 Factors Influencing Adoption of ICT by Small and Medium Enterprises in the Hospitality Industry in Kenya

Introduction

Lack of utilization of ICT to provide access to timely, accurate and relevant information and meet the information needs of SME in the hospitality industry is destroying these enterprises leading to increased operating costs, affecting their competitive advantage, reducing incomes and their growth and development.

Purpose of the Study

To investigate the factors influencing adoption of ICTs by Small and Medium Enterprises in the hospitality industry in Kenya and make recommendations for improving their adoption in accessing information by entrepreneurs in the hospitality industry in Kenya.

Objectives of the Study

- i. To establish the influence of the industry market characteristic on the adoption of ICTs by Small and Medium Enterprises in the hospitality industry in Kenya.
- ii. To explore the influence of the customer characteristics on the adoption of ICTs by Small and Medium Enterprises in the hospitality industry in Kenya.
- iii. To examine the influence of initial ICT installation and running costs on the adoption of ICTs by Small and Medium Enterprises in the hospitality industry in Kenya.
- iv. To establish the influence of technology characteristics on the adoption of ICTs by Small and Medium Enterprises in the hospitality industry in Kenya.



Mr John Kamau
ICT Department

1.2.4 An Empirical Investigation into the Effect of User Training on Adoption of Desktop Open Source Software by University Students in Kenya

Introduction

There is a lot of operation support systems (OSS) in the internet for download and adoption, but according to recent studies there are clear indications that users of desktop applications in Africa have not widely adopted these applications (Kamau & Namuye, 2012). The advocates of OSS have extensively promoted the software because it can be downloaded and adopted at no cost and yet it offers the same functionality as its Proprietary Software (PS) counterparts (Kandar, Mondal, & Ray, 2011). According to them OSS offers advantages such as reliability, stability, flexibility, freedom and the software is also free.

Objectives of the study

- i. To investigate the level of desktop open source software training by training providers in Kenya.
- ii. To investigate the effect of user training as a factor in the adoption of desktop open source software by university students in Kenya.
- iii. To investigate the computer literacy skills sought for by Kenyan employers.

1.3 Journal Publications

Mount Kenya University through the Directorate of Research and Development sponsored 12 research articles published in peer reviewed journals in the year 2014.

Table 3: List of publications for 2014 academic year

No.	Name	Publication citation format and Title
1.	Ms Sera Wairimu	Sera Kimaru-Muchai S, Mucheru-Muna M, Mugwe J.N., Mairuri F.S., Mugendi D.N (2014) "Client Focused Extension Approach for Disseminating Soil Fertility in Central Kenya." International Journal of Agricultural Extension. ISSN. 2311-6110 (online), 2311-8547 (print)
2.	Dr Stanlely Waithaka	Stanley K. W., Eliud N.N., Daniel M, C., Benard M, C., Leonard G.N., & Wilfred K.G (2014) "To Establish the reference ranges of tumor makers for adult Kenyan population."
3.	Ms Fridah Karani	Frida Karani (2014) "Strategic Organization Development and Project Performance for Not-for profit Organizations in Isiolo." Journal of Management and Business Research. ISSN No. 2306-9007
4.	Mr Paul Okinyi	Nyaruri Paul Okinyi & Maangi Eric Nyankanga (2014) "Traditional Customs among the Gusii of Kenya." Journal of International Institute of Science, Technology and Education. ISSN No. 2224-3178 (print), ISSN No. 2225-0964 (online) International
5.	Mr Jackson Ndolo	Jackson Ndolo & Eunice G. Njagi (2014) "The Role of Ethics in Procurement Process Effectiveness in the Water sector of Kenya." International Journal of Supply Chain Management. Vol. 3 No. 3, ISSN No. 2050-7399 (online), ISSN No. 2051-3771 (print)
6.	Mr Nahashon Karuga	Nahashon Karuga (2014) "Larvicidal Efficacy of Mundulea Sericea plant extract against <i>Anopheles gambiae</i> ." International Journal of Open Science Repository. SBIN No. 0003146
7.	Mr Peter Namisiko	Peter Namisiko & Catherine Munialo (2014). "Towards an optimization for E-Learning in developing countries: A case of private Universities in Kenya." Journal of Information Engineering and Applications. ISSN No. 2224-5782 (print), ISSN No. 2225-0506 (online)
8.	Dr Oyagi Nyakweba Benard	Oyagi Nyakweba Benard & Devoth F. Shirima (2014). "Assessment of the relationship between motivation and retention of academic staff in selected public higher institutions of learning in Dar es-Salaam." Journal of Business Management and Administration Research. Ms. No. JBMA-14-014
9.	Mr Appolonius Kembu	Oyagi Nyakweba Benrd, Kembu Appolonius and Devotha F. Shirima (2014). "Assessment of the level of job performance among academic employees in higher learning public institutions in Zanzibar." Journal of Business Management and Administration. Vol. 2, ISSN No. 2329-2954
10.	Mr Appollonius Kembu	Kembu Appolonius Shitiabi & Oyagi Nyakweba Benard (2014). "Assessment of Mentorship Programs on employees' performance in telecommunication companies in lalla District, Dar es Salaam." International Journal of Education and Humanities. Vol. 3 No. 1. ISSN No. 2320-3684
11.	Dr Simon Nderitu	Simon Nderitu (2014). "Innovative strategies for use of electronic media on traditional church relationship in selected churches in Kiambu county, Kenya." International Journal of Current Research. Vol.6, Issue 11, ISSN No. 0975-833x. page 10356-10362
12.	Dr Mercyline Kamande	Mercyline Kamande (2014). "The impact of skilled labour migration on remittance growth and development in Africa". Net journal of Business Management

1.4 Workshops

The University through its Directorate of Research and Development sponsored its staff members from all campuses to attend local and international conferences as elaborated below.

1.4.1 Academic Publishing and Communication Workshop

The Directorate of Research and Development hosted Private Universities Research Consortium at Mount Kenya University, main campus. Eighty participants of whom twenty five were from Mount Kenya University attended.

During the 2014 “*Academic Publishing and Communication workshop*” several speakers were invited to talk to the participants. Among them included; *Dr Charles Ngugi*, School of Journalism and Mass Communication at the University of Nairobi, *Prof. Faith Nguru*, Acting Vice-Chancellor, Riara University and *Dr Renson Muchiri*, Kenya Catholic University (KCA). Presentations on Communicating Research Output to the Public, Reviewing Journal Articles and Writing/Publishing Journal articles were made.



Dr Francis Muregi, Director, Research and Development delivers his remarks during 2014 Academic Publishing and Communication Workshop at Mount Kenya University, Thika.



Workshop officials and participants pose for a group photo during closing ceremony of research workshop at MKU, Thika campus.

1.4.2 Biosafety training workshop

Background

Mount Kenya University laboratory staff members completed a two-phase course on Biosafety and Biosecurity training organized by the Directorate of Research and Development. The initial training was carried in the year 2013. The trainers for this course were drawn from Center for Disease Control (CDC), Kenya Medical Research Institute (KEMRI) and from the National Public Health Laboratories, Ministry of Health. Mount Kenya University is amongst the few Universities in Kenya that have Biorisk Management Programmes in place making the working environment at the University safe.



Participants of the Biosafety and Biosecurity training pose for a group photo. With them is Prof. John Nderitu, DVC LRM. (Standing 7th from the right in a tie) and R&D staff.

The biosafety training workshop was organized with the following objectives in mind:

1. To impart knowledge and skills to the trainees on; a) Principles and programs of laboratory biosecurity, b) Occupational health and preventive services, c) Bioethics and dual use and, d) Laboratory planning and equipment safety.
2. To equip learners with knowledge necessary to conduct risk assessment.
3. To acquire knowledge and attitudes necessary to identify and apply biosafety and biosecurity principles in the work places.



Biosafety training participants in one of MKU Laboratories during a training demonstration

1.5 Conferences

1.5.1 The Genetic Epidemiology of Malaria Conference, 2014

Dr Jonathan Mwangi attended the Genomic Epidemiology of Malaria 2014 Conference that was held between 8th and 11th June 2014 at the Wellcome Trust Genome Campus, Cambridge in the United Kingdom.

This was a premier conference on malaria that is held biannually. It brings together malariologists working in different parts of the world to share knowledge on the current trends in malaria epidemiology and share research findings on possible ways to combat one of the world's biggest killer diseases. This year's conference had sessions on genomes and genome variation, genetic epidemiology of the malaria parasite, artemisinins resistance, genomics epidemiology of the human host, transmission and elimination of malaria among others. Dr Mwangi presented his research work on the "*genetic determinants of asexual proliferation rate in Plasmodium falciparum*". This work received rave reviews and got a special mention for the most outstanding research.



Dr Jonathan Mwangi (front row, 3rd from L) with some of the participants at the Wellcome Trust Genome Campus, UK

1.5.2 Africa Talloires Network Conference

Dr Francis Muregi, Director of Research and Development attended the Africa Talloires Network Conference held in South Africa on 7th November, 2014 to represent the University. The Conference convened leaders of Universities from around the world to chart the next stage of the global movement of higher education, civic engagement and social responsibility. The conference provided a platform for these leaders to share their experience and plans, identify ways to support each other's work, and develop priorities for collective action. In this crucial era in which the growing global movement of Universities seeks to move beyond the ivory tower paradigm, Talloires Network Conference highlighted and reinforced the compelling leadership of national, regional and international networks that are advancing University-community partnerships on all continents.



Dr Francis Muregi during the Talloires Network Leaders Conference held in November, 2014 in South Africa.

1.5.3 Sixth (6th) Africa Nutritional Epidemiology Conference

Theme: Food and Nutritional Security in Africa: New Challenges and Opportunities for Sustainability.

This was a five day conference which was held on 21st - 25th July 2014 in Accra Ghana. The conference provided an important forum for insightful deliberations from the African context. There were lots of interaction of ideas and information between academicians, professionals, industrialists and practitioners in order to enhance the understanding of "Food and Nutrition Security in Africa". Prominent Scholars & practitioners from all over the world attended the conference. The conference approach was to deliberate on the current food and nutrition challenges as well as opportunities to address them. The conference emphasized on food systems as a sustainable way to address malnutrition in all its forms, this requires that all stakeholders work together to influence nutritional outcomes. Scholars provided useful insights on food and nutrition security.



Ms Esther Njeri presenting during Africa Nutritional Epidemiology Conference, Ghana

1.5.4 First Commonwealth Science Conference

Dr Francis Muregi, attended the 1st Commonwealth Science Conference organized by the Royal Society in conjunction with the Government of India held at the LaLitT Ashok Hotel in Bangalore from 25th to 28th November, 2014. The aims of the Conference was to accelerate excellence in Commonwealth Science, to provide opportunities for cooperation between researchers in different Commonwealth countries; to inspire young scientists; and to build scientific capacity in the developing Nations within the Commonwealth. The Conference was attended by 300 scientists and 70 PhD students from across the Commonwealth, together with local delegates from Bangalore. Representatives from over 40 countries also attended the conference to deliberate on scientific issues.



Dr Francis Muregi (extreme left), Director Research and Development and Prof. Some (2nd right), the CEO of Commission for University Education (CUE) poses for a group photo with other participants during the 1st Commonwealth Conference in India.

1.6 Collaborations

1.6.1 MKU Research team visits Del Monte

Preamble

In recognition of one of its core mandates, i.e. research and community outreach, the Research and Development team visited Del Monte Kenya Ltd. Processing plant on February 6, 2014. This was necessitated by a need to identify and build up local institutional linkages and especially those involving the industries. During the visit, MKU and Del Monte Kenya Limited staff deliberated on ways through which the two institutions can partner in terms of research and development. MKU staff briefed the Del Monte Kenya Ltd. members about the establishment of the Research and Development Center at MKU and the research infrastructure therein.

On the other hand, Del Monte Kenya Ltd. through its staff expressed their concerns with analysis being performed abroad and particularly in the USA. Del Monte is looking for a reliable alternative laboratory that can conduct these analyses locally. The company was particularly impressed to learn that the Research Center at MKU is equipped with a gas chromatography instrument. This instrument would be very appropriate for the analysis of pesticide residues. The meeting explored various ways through which collaborative research could be initiated. The call was concluded by a visit to their analytical and biological laboratories.



From Right: Ms Carolyn Achieng'a (Senior Departmental Head, Special Projects & Plantation Quality Control), Mr Samuel Chomba (Senior Departmental Head Agronomy), Dr Nancy Cheseto (MKU Deputy Director, Enterprise & Innovation), Dr Peter Kirira, (MKU Deputy Director, Research & Development), (MKU Dr Samuel Karenga, HoD Pure & Applied Sciences Research Program) and Mr Charles Muriuki Departmental Head, Research & Development Laboratory, (Del Monte Kenya Ltd.).

1.6.2 MKU host KEMRI for a consultative meeting

Mount Kenya University, main campus hosted Kenya Medical Research Institute (KEMRI) for a consultative meeting where they discussed and agreed to partner in collaborative research, sharing of research infrastructure and equipment, joint student supervision and skills/technology transfer. The joint team visited the MKU Anatomy Laboratory at the General Kago Road Funeral Home explore on status of the Laboratory. General Kago Road Funeral in collaboration with MKU hosts clinical medicine students where they conduct their respective biological experiments.



MKU research team led by Dr Peter Kirira, Deputy Director Research and Development (2nd Left) pose for a group photo with KEMRI researchers at the General Kago Road Funeral Home.

2.0 Enterprise and Innovation

2.1 Enterprise, Innovation and Incubation programme

In recognition that many graduates lack adequate soft and technical skills to transit to the labour market, Mount Kenya University in early 2011 established the “ **Mount Kenya University Incubation Programme**” meant to equip its graduates with relevant and adequate skills to make them competitive in the job market. The University also reckons that although it is important to produce employable graduates, it is no longer tenable to only train ‘job seekers’. The program, coupled with the University’s relevant and market driven programs in Health and Applied Social Sciences is therefore geared towards addressing the problem of unemployment through training a critical mass of “job creators”. The Enterprise, Innovation and Incubation programme has to date successfully incubated innovations from students and alumni that have been commercialized.

2.2 Enterprise Academy Pioneer Class of 2014

In recognition of the fact that the ultimate indicator of a successful innovation or business idea is its social impact as well as its commercial value, the University established an Enterprise Academy in 2013 to bridge the chasm between knowledge generation and utilization. The Academy has received a generous initial 5-year funding from the University management through injection of Ksh. 40 million into the Mentorship, Innovation and Entrepreneurship Fund (MIEF). From the fund, a total of 10 young apprentices (innovators/entrepreneurs) were targeted to benefit with initial seed grant of Ksh. 80,000 per year for every innovative business idea. It is envisaged that the Academy will spur the discovery and development of new knowledge and its subsequent exploitation for the Socio-Economic development of the Kenyan People and the region in line with the objects of Kenya Vision 2030. The pioneer class of 2014 had 9 apprentices with business ideas in tourism, technological, agricultural and beauty sectors.

2.3 Meet Enterprise Academy Apprentices, 2014

The Directorate of Research and Development incubated 9 apprentices of Enterprise Academy 2014 from February 1 to May 7, 2014. Based on the viability of their business plans, the apprentices were awarded Ksh. 800,000 seed capital.



The Enterprise Academy 2014 apprentices pose for a group photo with Mr Vimal Shah, CEO Bidco Oil Refineries, after a mentorship session at BIDCO Headquarters, Thika. With them are Drs Francis W. Muregi & Samuel Karenga.



What a good way to start the day. The apprentices were up for the gym session at 6.00am every morning. Every afternoon after mentorship, they also attended swimming lessons offered by a professional trainer.



Stephen Opanda, 25

Stephen has established a media company called "Sauti Kweli". He says he was transformed from the journalist he was into an entrepreneur by the mentorship programme of the Academy. For him, joining the Enterprise Academy was the spark he needed in life and believes things will never be the same again. *"The experience exceeded our expectations and has prepared us to conquer the world".*



Peter Inganga Buluma, 29

"I joined the Academy because I wanted to develop the company to create more jobs for young people," says the ambitious young man who runs *"Royal Family Cleaners Crew"* based in Eldoret that deals in commercial and residential cleaning. The company was started last year.



John Murei, 32

John's story is perhaps the most inspiring at the Academy. After his poor parents failed to pay for his university education, he moved to Nairobi to stay with his uncle. After a short while, his uncle would send him to run some errands like paying of electricity and water bills. From there I started offering my services to many people and thought why not transform it into business. That is how Errand Classic Family was born.



Faith Ngutiku, 30

For **Faith**, *"no matter how much capital you give to somebody to start a business, if you do not first change their mind set, it won't make any difference"*, says the entrepreneur who has established an interior decoration company, Faz Luminous. Among the most important traits she acquired from mentorship programme is persistence and focus. *"Some of our mentors started businesses which failed but that did not kill their entrepreneurial spirit"* she says.



Godfrey Ngotho, 25

Godfrey and his twin brother Geoffrey Kuria run a web design, hosting and consultancy firm called *"Kipacha Technologies"* based in Limuru. For him, the biggest lesson at the academy was on managing finances and success. After graduating from the Academy, Godfrey first registered the company which he says was operating virtually. This has enabled the twins to compete for government tenders.



Stellamaris Kathomi Miriti, 23

For **Stellamaris**, the MKU Enterprise Academy empowered her on business management skills. Stemming from her traveling experiences, she has established a travel and tour company called *"Stejos Tours and Travel"*. *"It was a great opportunity for me,"* says Stellamaris. *"I have a great view of the world now."*



Paul Mwago Mwangi, 25

"Basically, I cannot go back to employment, business is where my future is," says Paul, a 2012 MKU graduate of business and information technology. After graduating, Paul secured a low paying job as a college tutor but realized soon that he was not getting the fulfillment he was looking for. His mind was elsewhere. He had always wanted to start an entertainment company dealing in computer games and a gym. He started a small business in Thika dubbed *"Fun2venture"* Simulated Systems and Gaming Café but realized he needed to do more if he had to make meaningful gains. Thus, when MKU Enterprise Academy opportunity came, he pounced on it. From external mentors who include Keroche Breweries MD. Tabitha Karanja, Paul says he learnt never to relent but to stick to his goals.



Bernard Wanjau, 27

Bernard is a graduate in Animal Health and Veterinary Technology. He has a deep passion for animal farming and established a firm by the name "*Friends of Farmers Initiative*". The company deals in agro-processing of animal feeds. He has also been doing disease control, artificial insemination and selling drugs to farmers. The experience at the MKU Enterprise Academy was one of its kinds for Bernard, he says. "I learnt key lessons in marketing, branding and positioning in the market." "I will always deliver quality at home," he adds.



Lilian Kawira, 27

Lilian runs what can be called a briefcase company termed as "Lilac Body Care" that manufactures hand wash gels, lotions, detergents and shampoos. Lilian, who had a stint at the banking industry for two years, says she will never look that way again. "I don't have to go looking for a job," she says.

2.4 Meet the Enterprise Academy 2014 Professional Mentors

To ensure Enterprise Academy Apprentices 2014 become successful in their varied business ventures, Mount Kenya University identified potential business professionals to mentor the candidates. The external professional mentors included the following:

2.4.1 Mr Vimal Shah, the CEO of Bidco Oil Refineries

As a business man in the corporate sector, Mr Vimal Shah has transformed Bidco from a small garment factory to one of the largest Kenya-born multinationals. Mr Vimal Shar encouraged the apprentices to think outside the box and come up with viable business ideas which could help create employment opportunities for themselves and other youths.



Mr Vimal Shah, the CEO of Bidco Oil Refineries during a mentorship session at the refinery in Thika.

2.4.2 Mr Peter Munyiri, the Family Bank Managing Director

Mr Munyiri's journey to the helm of Family Bank has seen him work at the Treasury, Barclays Bank, Standard Chartered Bank, Cooperative Bank and Kenya Commercial Bank. Mr Munyiri holds a Master of Business Administration (MBA) in Strategic Management from Newport University. He encouraged the apprentices to develop the character of making personal savings, be good managers of their little resources they own and never to hesitate in taking business risks if they have to become world-class entrepreneurs.



Mr Peter Munyiri, the Family Bank MD/CEO during a mentorship session at Family Bank Towers, Nairobi.

2.4.3 Mr Daniel Mungai, the Proprietor of EmmaDaniel Creations

Mr Mungai started as a matatu tout but has since built a profitable business enterprise. He runs a bakery school, an outside catering firm, production house and a studio.



Mr Daniel Mungai, the proprietor of EmmaDaniel Creations (centre, front row) pose for a photo with the apprentices after a mentorship session at his catering school.

2.4.4 Madam Tabitha Karanja, the Managing Director of Keroche Industries

Ms Karanja is credited with being the Founder and current CEO of Keroche Breweries. Keroche Accounts for about 20% of Kenya's beer production. She was awarded the Business Woman of the year 2014 award at the CNBC All Africa Business leaders Award. She encouraged apprentices to cultivate the element of patience, perseverance and make critical decisions that will add value to their current life.



Madam Tabitha Karanja, the Managing Director of Keroche Industries posing for a photo with the apprentices, after one of the mentorship session at the firm's premises in Naivasha.

Other Mentors

2.4.5 Mr Joseph Nganga, the proprietor of Scissors, a chain of Executive Barber Shops



Mr Joseph Ng'ang'a talking to the apprentices during a mentorship session at Scissors in Limuru.

2.5 Enterprise Academy graduation ceremony

The pioneer class of Enterprise Academy 2014 graduated on May 7, 2014 in an occasion graced by among others; Dr Simon Gicharu, the Founder of MKU and the Sponsor of the Academy, Mr Vimal Shah, the CEO Bidco Oil Company, the VC Prof. Stanley Waudo, Mr David Thuku (Family Bank Career Retail banker) and other representatives of Family Bank. Professional mentors; Emma Daniel, Peter Kiongo and Joseph Nganga. The Chief Guest was Prof. Peter Wanderi, then at Kenyatta University.



Dr Simon Gicharu the Founder of MKU and the Sponsor of the Academy during the graduation ceremony, 2014. With him are Prof Peter Wanderi, Mr Vimal Shah and Enterprise Academy graduands



Dr Simon Gicharu (seated 2nd from Right) with some mentors and Enterprise Academy graduands.



Mr Vimal Shah receives a token of appreciation from VC-Prof. Stanley Waudo during the Enterprise Academy graduation ceremony



The Vice-Chancellor and Director R&D during Enterprise Academy graduation ceremony

2.6 Microfinance Incubation and Technological Incubation Programmes

The Directorate of Research established a Microfinance and Technological Incubation Centres. These facilities house the mentorship and training programmes for students with business ideas and technological innovations respectively.

2.6.1 School of Business and Economics (SBE)

The current academic structure does not place a lot of emphasis on practical skills most of which are learned during internship or on job-training. With the large number of graduates from our colleges averaging about 50,000 per annum according to the 2013 Economic survey report, it has not been possible to place about 70% of them. Furthermore, the industry has constantly complained of graduates who lack in soft skills, which affect their employability. In view of the above, the Directorate of Research and Development in liason with the School of Business and Economics designed a Microfinance Incubation Programme under REIDC to impart soft skills geared toward enhancing graduates employability. The training takes approximately six months and the participants are selected by interviewing potential applicants. The first three incubates graduated in August 2014 and currently we have three on board. As we source for sponsors who will partner with us in order to achieve the programme's objectives effectively, the training still goes on conducted by faculty from the School of Business and Economics.



Dr Emma Anyika, the Patron, Microfinance Incubation Programme (right) with incubates

3.0 COMMUNITY OUTREACH INITIATIVES

3.1 The National Water summit

Mount Kenya University hosted a National Water Summit in October 9th & 10th, 2014 at Kristin camp in Turkana County aimed at tackling the challenge of water in Kenya. The Summit was graced by his Excellence the retired 3rd president of the republic of Kenya, Hon. Mwai Kibaki. The theme of the Summit was "Water for Socio-Economic Development."



Flags fly at the shores of the Lake Turkana during the inauguration of the Water Summit Workshop by H.E. Mwai Kibaki

Objectives

To assemble key players to deliberate on sustainable groundwater management in vulnerable areas, suggest strategies for local community involvement in the exploitation and management of water sources, make policy recommendations for sustainable groundwater development and management and identify capacity research gaps in groundwater management.

The retired president called on summit participants to explore how best to use water to effectively boost Agricultural production, Mining, Manufacturing and Recreation. He further encouraged rain water harvesting to reduce the pressure on existing water sources.

The summit was attended by representatives from Kenya, Uganda, South Sudan, Ethiopia, Germany, Israel, Japan, Netherlands, Rwanda, Slovakia and USA.



H.E Mwai Kibaki cuts the tape during the opening of the National Water Summit Conference as the Turkana Governor H.E Josephat Nanok looks on.

Resolutions

1. Collaboration between the Ministry of Environment, Water and Natural Resources with the County Governments and Non-State Actors be strengthened to address issues in the water sector. These should include planning and implementation.
2. There is an urgent need to address point and non-point pollution, starting at individual households to the industrial level. The State Department of Water should widen and sustain awareness campaigns at local and national level and at the same time propose punitive measures against water and environmental pollution in general.
3. The roles of national and county governments with respect to water resources management and development needs to be defined clearly and cascaded according to the Constitution.
4. Sufficient storage of fresh water for human use, livestock and crop production be used to mitigate conflicts between competing interests.
5. Universities and research institutions should scale up research activities in the water sector.
6. There is need to increase State funding to develop the water sector.

Recommendations

1. Individuals need to be encouraged to increase water harvesting capacity and practice efficiency in water usage.
2. The Government should move away from developing small dams, and instead commence construction of large multi-purpose dams that can hold enough water for more than 2 seasons of no rainfall.
3. There is need to improve monitoring of water resources using all indicators of success.
4. Kenyans should be willing to relocate from their ancestral lands to pave way for multipurpose dams to increase water security in the country.
5. Kenya and other developing countries should consider the smart and innovative water management techniques such as those used in Israel to increase food security and ensure sufficient water for domestic use.
6. All water plans should be aligned from the County to National level
7. Organize an annual national media workshop and award on water to coincide with the World Water Day. This will encourage journalists to write more on water issues.
8. The media plays a key role in development of societies. There is need for sponsor journalists to train in environment, energy, water and sanitation issues to be able to adequately cover the issues in the sector.
9. Academic and research institutions including the private and civil society should work more closely to generate sufficient data on water resources in the country to enable sound policies to guide resource allocation.
10. Since some water is a trans-boundary resource, the regional countries should work more closely in planning and utilization to improve the living standards of the people.
11. Future water summits should be used as forums for dissemination of research findings in the water sector.

National Water Summit at a glance





H.E Mwai Kibaki delivers his speech during National Water Summit at Lake Turkana

Map water points afresh, Kibaki says

Ex-President calls for more efficient management of ground water

BY SAMMY LUTTA
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Former President Mwai Kibaki is seeking fresh mapping of all fresh water resources.

This, he said, is for the purpose of planning and important to know the locations, quality and quantity particularly in arid and semi-arid areas.

"This will in turn determine what kind of technology the country requires to extract, replenish and preserve the

“

The Constitution has made Turkana regain its rightful place”

Former President, Mwai Kibaki



and management.

He said that all ten

claimed there were possibilities of people with self-interest developing the land.

Mr Kibaki, however, said that there was an urgent need to encourage the county governments and their people, especially landowners, to construct water pans and up terraces in order to build up recharging existing water aquifers, or water-bearing layers of permeable rocks.

Turkana County Governor Josephat Nanok said that only 40 percent of Turkana residents can access water and expectations have been high following the discovery of massive deposits of water.

Mr Nanok said that discussions at the summit would generate solutions for the water resources.



Kibaki (center), Africa Water Development Authority Chairman and Turkana Governor Josephat Nanok (right) at Kristine Camp, Lake Turkana.

Improve water management to boost agriculture, says Kibaki

By JOY OMBORI

Former President Mwai Kibaki has challenged experts to explore ways water can be used to effectively boost agricultural production in the county.

Speaking at the summit, Kibaki said that the county government should focus on water management to boost agricultural production. He said that the county government should focus on water management to boost agricultural production.

The retired President, who is the patron of the Millennium Water Access Project, said the summit marked a new beginning of water management in the county. He said that the summit marked a new beginning of water management in the county.

Turkana >

Leaders worried as lake water recedes due to river diversion

BY SAMMY LUTTA

The water level in Lake Turkana has begun to drop following the diversion of River Omo into an Ethiopian dam.

County officials are worried that continued decline of the water will threaten the lake's ecosystem, which includes local people who largely depend on the lake for their livelihoods.

supplies the lake, is scheduled to take three years.

At the end of the period, the lake's water level is expected to drop to at least 16 metres.

More than 500,000 pastoralists and fishermen, most of whom are Turkana, would be negatively affected, leading to conflicts over resources and water, according to the county government.

Leaders should monitor how resources are exploited and ensure a balance between reserves and recharge

Water Resources Ministry

Water Resources Ministry

Water Resources Ministry

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The Turkana Water Summit Conference hit the headlines in local newspapers



NATIONAL WATER SUMMIT CONCEPT NOTE TURKANA COUNTY, 2014



BACKGROUND

Mount Kenya University, in conjunction with the Government of Kenya, UNESCO, the County Government of Turkana, Nation Media Group, and the Institute of Capacity Building, is planning a water summit in October 2014 to deliberate on sustainable groundwater management. The theme of the summit is: Water for socio-economic development.

Three thirds of Kenya is either arid or semi-arid and is classified as being “water scarce”. Groundwater is a strategic resource that if sustainably exploited can mitigate effects of extreme drought period. The world’s aquifers are an important source of water for people, animals and ecosystems especially in arid zones. Studies have shown that approximately a quarter of the global population lives in areas where groundwater supplies are being consumed at unsustainable rates. Recent estimates indicate that demand exceeds supply for nearly 20% of the world’s aquifers. For this reason cooperative arrangements that engage local stakeholders and which realize common interests are urgently needed.

Turkana County is almost entirely arid and semi-arid. Surface water sources are scarce while groundwater sources are not fully established and developed. In 2013 a UNESCO initiative mapped out huge groundwater reserves in the central parts of the County of Turkana. The question that immediately arose: How will the ‘discovered’ groundwater be put into better economic use for the benefit of the local community?

The summit will address some of the concerns of sustainable groundwater management and will bring together both national and county government, industry, non-governmental agencies and universities to share and discuss cooperative and sustainable water development and management strategies. Summit participants will produce a working document of policy recommendations that address sustainable development of groundwater resources. This working document will be shared with various stakeholders to inform policy and decision-making.

OBJECTIVES

- To assemble key players to deliberate on sustainable groundwater development and management in vulnerable areas.
- Suggest strategies for local community involvement in the exploitation and management of water resources.
- Propose coping strategies in the face of harnessing of groundwater in Turkana County.
- To make policy recommendations that would guide sustainable groundwater development and management
- To identify capacity and research gaps in groundwater management.

The summit will be held at Kristine’s Camp, Lake Turkana, Kenya from 9th-10th October 2014.

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Mount Kenya University



Ministry of Environment,
Water & Natural Resources



County Assembly
of Turkana



SPEECH BY:

HIS EXCELLENCY HON. MWAI KIBAKI, CGH, 3RD PRESIDENT OF KENYA AND PATRON ON MILLENNIUM WATER ALLIANCE DURING THE OFFICIAL OPENING OF THE NATIONAL WATER SUMMIT HELD IN TURKANA COUNTY ON THURSDAY 9TH OCTOBER, 2014

The Governor, Turkana County,

Hon. Josphat Nanok

The Pro-Chancellor Mount Kenya University, Prof. Chacha Nyaigotti-Chacha

Vice-Chancellor Mount Kenya University,

Prof. Stanley Waudu,

Members of Mount Kenya University Council

Your Excellencies the Ambassadors

Director of UNESCO Region Office for East Africa, Dr Mohamed Djelid, Principal Secretary, Ministry of Environment,
Water & Natural Resources

Chairman Board of National Water & Pipeline Corporation,

Distinguished Guests

Ladies and Gentlemen

This summit on 'Water for Socio-Economic Development' in Kenya is as timely as it is crucial.

Those of us gathered here today—if we purpose so as we indeed should—occupy the cusp of a new beginning in the realm of water management in Kenya and the region. I am therefore delighted to be part of this potentially game-changing event.

Coming at this juncture, the summit presents a perfect moment to retool policies related to the management and development of natural resources—in general—in this part of the world. It is also a suitable time to reflect on how we have fared in our role as stewards of the natural resources endowed to our part of the earth.

More specifically, this is a worthy moment to critically examine our effectiveness and efficiency in accessing, conserving and utilising water—particularly ground water—as a catalyst for human tranquillity, welfare and prosperity.

I pick on water, not simply because it is the subject matter in focus in our midst today but because it is arguably one of, if not, the single most abundant natural resource on earth. Water, essentially, is the one natural resource that is most laden with curious contradictions.

Ladies and Gentlemen,

One of the most significant measures of human progress across human history relates to the manner in which societies have developed competencies in accessing, using and conserving water. Indeed, notable human civilisation the world over is intertwined with settlement along waterways and courses.

To a large extent, it is because we recognise the marvellous catalytic influence water has upon human progress that we are gathered here today.

It is interesting to note the extent to which the management and development of water resources and not the diminishing factor of water, have for ages presented the core challenge to mankind as relates to access, sharing and full use. We must always bear in mind that ground water is a finite resource which when used irresponsibly can get exhausted.

Thankfully, to address this challenge, 'Water Governance' as a policy and management doctrine has emerged in recent times. Fundamentally, 'Water Governance', entails a joint approach to securing access and efficient management of water resources.

Joint in the sense that the concept brings together players from political, economic, administrative, social and cultural institutions with a view to ensuring that these various actors execute their mandates towards promoting safety, social development and prosperity for all.

Water Governance enables public authorities, communities and the private sector to make appropriate decisions on how to efficiently develop and manage water resources.

My hope is that contributions made during this two-day summit will further enrich the concept of Water Governance and contribute to global excellence in water resource management.

Ladies and Gentlemen,

We know that water is critical—indeed inevitable—to human existence. Beyond that, water, by far, holds the promise for much more than the conventional uses the human race has tended to confine it to.

That is the reason why I am pleased that this summit, in part, aims at unlocking the economic potential of water utilisation.

To this end, I urge that during this summit, participants explore how best to use water effectively to boost agricultural production, mining, manufacturing and recreation.

By effectively, ladies and gentlemen, I mean all ways that can improve the manner in which we extract, use, store and recycle water. In this endeavour, we must also address how to enhance technological capacity at national and county levels.

That way, we shall create jobs and a critical pool of technical skills needed to boost our pace of development. Indeed, the manufacture of tools for water extraction, harvesting, distribution and recycling should be viewed as an opportunity for employment and wealth creation for the counties and the nation at large.

Water Governance must also address the question of lack of awareness in our society regarding basic conservation principles. We need to work together to create this critical awareness, in order to guarantee the recharging of aquifers and the protection of water towers as well as catchment areas throughout Turkana and other parts of our country.

For example, there is an urgent need to encourage the County Governments and their people, especially the land owners, big and small, to undertake the construction of water pans and make terraces in order to recharge our aquifers. This will renew our ground water reservoirs to facilitate long-term access to water for farming, livestock and other social economic uses.

Equally, as we seek to increase access, it is important to make sure that, as we create water-points, especially around boreholes, we avoid turning water access points into mini deserts. Creative ways of controlling, distributing and directing the flow of human and animal traffic should therefore be an integral part of our water site management practises.

And so should be constant greening of the land close to water access points in order to protect the environment. Still on aquifers, I am convinced that time has come to map all our ground water resources afresh.

For planning purposes, we need to know, for instance, the location, quality and quantity of water resources, particularly in arid and semi-arid areas. This will, in turn, determine what kind of technology we require to extract, replenish and preserve water resources in arid and semi-arid areas.

This is the only way we can draw yet closer to the objective of attaining sustainable management and development of ground water resources in vulnerable areas. By and large, all the resolutions arrived at during this summit should inform or at least inspire policies that aim at global best practice in ground water development and management.

Ladies and Gentlemen,

Our society should from now onwards be encouraged to view water as a resource capable of lifting citizens, en masse, from the curse of poverty. I am, therefore, urging participants in this summit to craft ways that will actively influence the society to appreciate the potential of water beyond mere domestic use.

All too often and mainly due to ignorance, there has been a very unfortunate trend to designate some areas as unworthy of serious socio-economic activity simply because of their arid and semi-arid conditions. Turkana, where we are today, has suffered that negative branding for far too long.

But thanks to the new constitution, Turkana has regained its rightful position among other regions of Kenya and can now exploit its phenomenal resources for the development of its citizens and that of our nation.

On the whole, ladies and gentlemen, it is important to adopt water governance principles that will spur economic growth and turn the tide on the trends that may threaten the existence of the human race.

The time to inspire a positive change is now, and water should be accessed and managed for the benefit of the entire humanity and for posterity.

With those remarks, ladies and gentlemen, it is now my pleasure to declare the first National Water Summit officially open.

Thank you and God bless you all!

3.2 MKU and Partners For Care (PFC) Community Initiative Collaboration



Mount Kenya University Vice-Chancellor Prof. Stanley Waudo (3rd from R) seen here with Partners for Care (PFC) directors, sales & marketing analyst from Greif as well as staff from Massachusetts Institute of Technology (MIT) after they paid him a courtesy call. With them are members of staff from Mount Kenya University.

Preamble

Following a joint meeting of staff from Mount Kenya University and Partners for Care on 8th January, 2014 to discuss possibilities for partnership, a working committee was constituted with the following **Terms of Reference:**

- i) To identify priority research areas and prepare research concept paper.
- ii) To consult Dow Chemicals Ltd and prepare a research concept paper on agro-chemicals.
- iii) To explore possibility of participation in the Massachusetts Institute of Technology/Harvard University Global Health Care programme.
- iv) To identify community outreach programmes for joint participation.
- v) To co-opt persons with relevant expertise and experience.

The working committee identified six areas of partnership. These include; Water pack project, m-Health programme, project on engagement with MediShare to supply medical equipments, Global Health Care programme, Dow chemicals project and Jigger campaign. To further understand the activities of Partners for Care, six members of the working committee members toured PFC's working station in Marurui Area, Thome. At the PFC facility, the team visited their offices, "Second Chance" School, PFC clinic and a Computer Training Centre.



MKU Team at Partners for Care offices in Marurui.

Following this engagement and further deliberations, a matrix was developed that outlines strategies for implementation of the programmes proposed to be implemented by MKU-PFC & Partners. The framework outlines expected inputs from each partner, expected outcomes, performance indicators, timelines and the schools/departments to be involved in each programme area. In addition, members of the working committee in consultation with relevant departments developed draft concept papers that will be further improved to start off some of the proposed projects. Activities in this partnership will involve Research, Community Outreach and Social Entrepreneurship.

MKU - PFC Achievements, 2014

Mount Kenya University in partnership with Partners for Care (PFC) established 4 community outreach initiatives;

1. m-Health

This is a mobile platform for networking/linking Patients with doctors using a mobile platform in informal settlements (Marurui Settlement). Clinical officers and other health personnel visit areas where there are no medical facilities and once they identify a patient they feed the clinical symptoms into the mobile phones and the information is relayed to the doctor in the clinic who is able to make diagnosis. The doctor advises if the patient is to visit the clinic or gives a prescription. This way, one doctor is able to provide care to many patients in a day.

2. Water pack project

This is an innovative project which entails replacing Jerricans in the rural communities with a "water pack" (a water pack that is able to hold 20L of water and has a dispenser) that is a more affordable and hygienic way of ferrying water from long distances, as well as storage and dispensing. The water pack is currently being manufactured in Turkey. Deliberations are underway to determine the possibility of the water pack being manufactured locally here in Kenya. MKU Research team provided expertise on impact assessment and product re-designs.

3. Hospital equipment

Partners for care have sourced hospital equipment donated from Medi-share and taken them to needy hospitals such as Marsabit Hospital. Mount Kenya University provides impact assessment expertise. In addition, the possibility of getting medical supplies for Thika Level 5 hospital is being explored.

4. Jiggers campaign

Mount Kenya University in partnership with Partners for Care organized a jiggers' campaign sensitization in Marsabit, Kenya. The main objective was to increase the impact of the jiggers' campaign in Marsabit County by providing the personnel required to reach a larger population.

3.3 Kenya Agricultural Productivity and Agribusiness Programme-Africa Indigenous Vegetables (KAPAP-AIVs) Value Chain: Deepening and Up-scaling Project: Community Inception Workshop

The workshop aimed at educating farmers on modern farming methods to increase productivity.

The theme was "Enhancing production, value addition and marketing of indigenous vegetables (cowpea, spider plant, nightshades, amaranth and pumpkin), French beans and mushrooms among smallholder farmers in Kenya: Deepening and up-scaling in Butere and Mumias Sub-counties".

In response to a call for competitive grant research proposals by the (KAPAP) in 2010, Mount Kenya University (MKU), University of Nairobi, Chuka University, Jaramogi Oginga Odinga University of Science and Technology, Egerton University, Kenya Industrial Research and Development Institute (KIRDI) and National Museums of Kenya (NMK) developed a joint research project proposal which was successfully reviewed and approved for financial support. Farmers benefited on modern farming techniques to enhance productivity especially of vegetable crops between 2011 and 2014 .



Training of farmers at site in Butere-Mumias

4.0 SENSITIZATION AT CAMPUSES

4.1 Campus Sensitization Forums

Mount Kenya University has a total of sixteen campuses across East African region. Campuses in Kenya include; Nairobi, Nakuru, Kisii, Kitale, Nkubu, Mombasa, Eldoret, Lodwar, Kakamega, Kabarnet and virtual varsities. Apart from Kenya, other campuses in the Eastern African region are Kigali in Rwanda and Hargeisa in Somali. All campuses are committed to conducting quality research in accordance to the University's research strategic plan. The Directorate of Research and Development coordinates all activities of research through campus coordinators by ensuring smooth communication between the main campus and all campuses. In 2014, the Directorate of R&D conducted a research sensitization across all MKU campuses.

Objectives of the sensitization programme

- i) Informing members of staff about the University research administrative structure, University research agenda, and flagship projects.
- ii) Sensitization of campus research teams on their role in driving research agenda in the campuses.
- iii) Campus research needs assessment.

To achieve these objectives, the following activities were carried out;

- i) The research team met with the campus directors and the campus research coordinators. During this meeting, the research administrative structure at the campus was discussed as well as the roles and responsibilities of the campus research coordinator and research committee.
- ii) The research team with the assistance of campus directors had a joint meeting with campus research committees and members of staff. During these meetings, the following issues were discussed;
 - Mandates of R&D directorate in administering research at the University.
 - The devolved research structures at campuses and their role i.e. research coordinator and campus research committees.
 - The role of individual members of staff in implementing the research agenda.
 - Copies of University research documents e.g. Policy documents, guidelines.
 - Sensitization on the University research agenda, existing research & innovation grants, incubation and enterprise programme and research & innovation awards.



MKU Research team (both photos) at Kigali campus, Rwanda.

Campus Research Sensitization at a glance



a



b



c



d



e



f



g



h

MKU Research team during campus research sensitization campaign at a- Nkubu, b- Eldoret, c- Kisii, d- Lodwar, e- Kabarnet, f- Kakamega, g- Kitale and h- Nakuru .

5.0 CAMPUS REPORTS

5.1 Lodwar Campus



Ms Elizabeth Tabuka
Research Coordinator, Lodwar campus

Lodwar campus has two members in the Department of Research and Development, the Coordinator and the Farm Supervisor. As per the University statutes and mandates, the department is working under direct supervision of the Deputy Director Academic Affairs. The department is interested in promoting the livelihood of the community through research and development.

The campus hosted the International Water Summit on 10 – 11th October, 2014. It also had a successful public lecture on 8th November, 2014, the theme being: *“striking a balance between work and studies”*. The main speaker was Prof. Henry Embeywa Etende, Associate Professor of Education, Mount Kenya University. An average of 200 people attended the lecture.

Lodwar campus has a green plantation within its 120 acres of land in Lodwar town. In the year 2014, the campus fraternity planted several vegetable family groups including spinach, tomatoes, carrots, capsicum and cucumber. The crops sprouted well but later withered with only spinach surviving due to drought. However the spinach was too salty for human consumption. In an effort to improve the environment, the department planted tree seedlings around the compound thus improving aesthetic value of the campus.

Green house farming in Lodwar Campus

The Research team is working together with the research coordinator at the Lodwar Campus to explore most adaptive crops that can be grown in the Turkana County. This knowledge will be shared with the local community and is expected to contribute to improving food security in the area. Green houses will be used to grow early maturing crops such as vegetables including; tomatoes, spinach, kales, onions, cabbage among others.



A green house at MKU, Lodwar campus.

5.2 Nairobi Campus

Staff Training



Ms Jane Njuguna
*Research Coordinator,
Nairobi campus*

The Nairobi campus in coordination with the Directorate of Research and Development, organized for a research sensitization seminar for staff members. The resource persons for the training were; Dr Peter Kirira, Deputy Director Research and Development, Dr Samuel Karenga, Head of Pure and Applied Sciences Research Programmes. The Nairobi campus staff members were guided on the following;

- (i) Mandate of the Research Directorate
- (ii) Community research
- (iii) Activities on course
- (iv) Campus journals
- (v) Memorandum of Understanding (MoUs) of Mount Kenya University
- (vi) Training opportunities

The staff training workshop was followed by a research seminar where the guest speaker Prof. Winston Akala, from the University of Nairobi spoke about “*Anchoring Research in Academic Programmes*”. The talk opened the discussion door for most problematic areas of research such as proposal/concept note development for funding, publishing, dissemination of research output, community outreach initiatives among other issues.

Research dissemination

Mount Kenya University supported a number of Nairobi campus staff members to attend conferences where they made presentations of their research work, interacted with other researchers and networked for betterment of their research skills. This aimed at rendering the MKU staff members more competent and focused on research to ensure quality education is maintained throughout all campuses.

Nairobi campus staff published 5 research articles in reputable peer-reviewed journals. There is a total of 15 ongoing research projects by its staff currently.

Publications

Table 4: Nairobi campus publications

S/N	Publisher Name	Publication title
1.	Mr Martin Muiruri	ICT and Market Efficiency: A Case of Nairobi Securities Exchange. European Journal of Business Management Vol.6 No.29,2014
2.	Mr Kabunga A, Muya F, Gitau E.W & Njuguna J.M.	Secondary Traumatic Stress among Mental Health Practitioners in Butabika and Mulango Hospitals in Uganda. International Journal of Liberal Arts and Social Science Page 1-7 (8), 2014
3.	Mr Kabunga A. & Muya F.	Work Stress and Coping Strategies: A Case of Northern Uganda. International Journal of Liberal Arts and Social Science V.2(8) pp33-37, 2014
4.	Ms Carolyne Kirigo Kinyua	Factors Influencing the Growth and Sustainability of Mobile Money Transfer Service: A Case of M-Pesa in Kenya. International Journal Scientific Research Journal in Business and Management. ISRJBM Vol.1 Issue 10, October 2014
5.	Ms Christine Njuguna	Impact of Post-Election Violence on Economic Situation in Africa

Ongoing Research Activities

Table 5: Ongoing Research Projects

S/N	Principal Investigator	Research Title
1.	Ms Christine Njuguna	Investigation of Relationship Between Socialization and Guidance and Counseling Seeking Attitudes Among Secondary School Students in Kenya (PhD Thesis)
		Influence of Self Concealment and Attitudes Towards Seeking Voluntary Counseling and Testing Among Students: A Case of Kenyatta University, Kenya.
2.	Ms Joyce Muchemi	Transitional Justice and Peace Building (PhD Thesis)
3.	Ms Lucy Kibe	The Nature and Effect of Entrepreneurial Training on Owners of Micro and Small Enterprises in Nairobi, Kenya (Awaiting Publication)
		Effects of Social Capital and Social Innovation on the Performance of Social Enterprises in Kenya (PhD Thesis)
4.	Ms Mary Nginya	Stigma and Discrimination on Participation of Children Living With HIV/AIDS in ECE in Kenya (PhD Thesis)
		Children Voices on Stigma and Discrimination on the Rights of Children Living With HIV/AIDS in Kenya
5.	Ms Mary Muindi	A Critical Discourse Analysis of Sexist Language in Kamba Popular Songs (PhD Thesis)
6.	Mr Kabunga A, Muya F, Njuguna J., Njuguna C. & Nginya M.	Burnout Levels among Professional Counselors in Butabika and Mulago National Referral Hospitals in Uganda (Awaiting Publication).

7.	Mr Kabuga Amir, F. Muya, J. Njuguna, M. Muindi	Emotional Labour Among Administrative Assistants in Mount Kenya University: A Case of Nairobi and Thika Campuses (On Going Study)
8.	Mr Kabuga Amir	Relationship Between Emotional Intelligence and Levels of Compassion Fatigue Among Psychotherapists in Northern Uganda (PhD Thesis)
9.	Mr Karuri Thiongo	Farmers Coping Strategies to Drought and the Implication to Farm Productivity in Machakos County (PhD Thesis/ Data Collection)
10.	Mr Elias Maore Kamoyo	Critical Evaluation of Gaps and Overlaps of the Regulations of the Mobile Banking in Kenya (PhD Thesis)
11.	Mr Alex Kariuki	Optimal Mixture Constraints for Second Degree Model with Application Nutrients and Price of Flour (PhD Thesis)
12.	Mr Titus Muriithi	Species Distribution Model Using Generalized Linear Models and Bayesian Techniques (PhD Thesis)
13.	Ms Lucy W. Kang'ori	Peer Counselors Training Manual (Awaiting Publication)
14.	Mr Stanley Kirika	Irrational Borrowing Behavior: A Case of Cosmopolitan Savings and Credit Cooperative Organizations in Kenya (Awaiting Publication)
15.	Mr Titus Nyakundi	Self- Incriminating Privilege and the Fight Against Corruption in Kenya
16.	Ms Jane M. Njuguna	Quality of Education Service Delivery in Primary Teacher Training Colleges in Kenya: An Assessment Based on Policy Benchmarks and Students' Satisfaction (PhD Thesis)

5.3 Nakuru Campus

Vice-Chancellor's Research and Innovation Grant



Ms Ruth Nyambura
Research Coordinator, Nakuru
Campus

Four staff members namely; Pamela Ochieng, Esther Muiitta, Ruth Nyambura and Muhonje Irene received their first half of the VC grant, 2013-2014 academic year, worth Ksh. 50,000 each. This followed their successful application for the VC grant through the proposals submitted earlier on.

Conferences

Prof. Tom Nyamache, Ruth Nyambura and John Mwangi presented research papers during the 1st Scientific Conference held at the Chuka University on 29th - 31st October 2014. During the conference, Kibeto Rono, a BBIT student also presented his research paper. This was a good indicator for the tremendous growth of research activities in Nakuru campus. Many students were encouraged to see their colleague make presentation at an international conference and they

vowed to take research activities seriously in order to improve their research skills. Ruth Nyambura presented a paper during the Maasai Mara International Conference on 11th to 14th November 2014 while Christopher Makau presented a paper to the school of International Society for Neurochemistry in Nairobi.



Mr Wenslaus Makhatsa
Research Coordinator, Kakamega
Campus

5.4 Kakamega Campus

The Research Department organized 2 public lectures to enable participants acquire more research skills and knowledge. Invited speakers were Hon. Koigi wa Wamwere with the theme: *"Kenya: Resolving the challenge of Ethnicity"* and Prof. Johny Fredy Balzaa Arismendi with the theme: *"Struggle for Development in Multiracial and Multiethnic Continents: Case of Latin America and Africa"*

The Research and Development department at Kakamega campus organized sensitization seminars, public lectures and workshops for faculty and students.

Public Lectures

The campus organized two public lectures under the following themes: *"Ethical Challenges in Public Service (Corruption as a front burner issue)"* by Prof. Jane Onsongo – Commissioner, Ethics and Anti- Corruption Commission and *"New Pathways for Africa's development"* by Mr Pete Ondeng – Director, East Africa Centre for Leadership and Development. Staff attended several seminars, workshops and conferences. Seminars were Technology While workshops were held at MKU Eldoret and Kakamega Campus.

Publications

Table 6: Kakamega campus staff publications

Name of Staff	Article Title
Prof. Okirima Edward	Management as a determinant of effectiveness among selected public and private secondary schools in Eastern region of Uganda, Asian Journal of Management Sciences and Education, April 2013
	Currently finalizing on an accepted paper due to be presented in The International Journal of Arts and Sciences Conference in Canada in May, 2015
Mr Wenslaus Makhatsa	Currently working on a paper "Evaluation of Antimicrobial activity of Entada abyssinica plant extracts," to be published in the Journal of Microbiology and Biotechnology
Dr Sarah Kigamwa	Effects of Sequential treatments with Alendronate Parathyroid hormone (1-34) and Raloxifene on cortical bone mass and strength in ovariectomized rats, October, 2014
	Effects of Sequential osteoporosis treatments on tubercular bone in adult rats with low bone mass, Osteoporosis International, June 2014

6.0 MEET THE STAFF IN THE DIRECTORATE



Dr Francis W. Muregi
Director, Research & Development



Dr Peter Kirira
Deputy Director, Research & Development



Dr Samuel Karenga
Head, Pure and Applied Sciences Research Programme



Mr Francis Makokha
Head, Human Health Research Programme



Mr Humphrey Mwambeo
Head, Socio-Economic Research and Community Engagement



Mr Malala Joel Bonface
Research Assistant



Mr Willie Njuguna Muiruri
Laboratory Technologist



Ms Margaret Wangari
Administrative Assistant



Ms Loyce Nanyama
Administrative Assistant



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