1ST BIENNIAL CONFERENCE ON THE STATE OF HIGHER EDUCATION IN KENYA

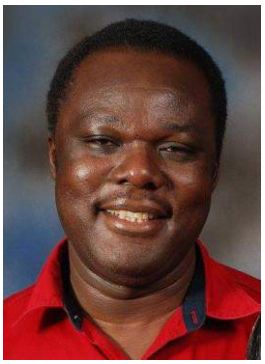
PROGRAMME & BOOK OF ABSTRACTS

THEME: QUALITY UNIVERSITY RESEARCH & INNOVATION

Quality: The Agenda

COMMISSION FOR UNIVERSITY EDUCATION
2016

Welcome to the 1st Biennial Conference on the State of Higher Education in Kenya



Kenya has attached great interest in education as a stimulant for economic and social development since 1963. Higher Education in Kenya has gone through a trajectory dating back in 1922 when the then Makerere College in Uganda was established as a small technical college which was then expanded to meet the needs of the three East African countries; of, Kenya, Uganda and Tanganyika/ Zanzibar, as well as Zambia and Malawi. Since that time, the sector has expanded phenomenally, and today the country has over 500,000 students studying within the sector. This has posed both challenges and opportunities. And as the country readies itself to climb to the next level of being knowledge based middle income level, there is need to examine how to grow the university sector that will live to the country's expectations.

It is in the light of these and other challenges that the Commission for University education has partnered with other players and stakeholders in the sector to co-host the first ever status conference on University Education in Kenya. The conference which will be held at Kenyatta University from 22nd to 25th August, 2016, will have local, regional and international speakers. It will seek to discuss the challenges and opportunities within the Kenyan University sector, with a view of building a truly world class and globally competitive university education system in Kenya. Issues that will be discussed include sustainable financing of University education in the country, strategies to boost research productivity of university academic staff, how to improve the management and quality of a rapidly expanding university education system, how we can boost training in the science, technology, engineering and medical fields, how to improve the quality of graduates produced, how to improve completion rates especially for postgraduate students, and how to align university education with market needs among others.

The Conference is being organized and is sponsored by the Commission for University education in collaboration with the Ministry of education, The National Commission for Science,

technology and Innovation (NACOSTI), Higher Education Loans Board (HELB), Kenya Universities and Colleges Central Placement service (KUCCPS), Technical, Vocational Educational Training Authority (TVETA), Kenyatta University, the University of Nairobi, Egerton University, The Chandaria Foundation, Karatina University, Mount Kenya University, Thomson Reuters, United States International University, technical University of Kenya, The City County of Nairobi and University of Kabianga and University of Groningen (NICHE project) among others. This is a truly local initiative that will go a long way in coming up with strategies and policies for improving the University sector in Kenya.

As the conference kicks in, I would like to acknowledge the many committees and individuals who have worked tirelessly with the LOC in planning, organizing and implementing the technical and social programs. With deep humility, I want to acknowledge the members of the scientific committee (headed by Prof. Jackson Too and Prof Ratemo Michieka), Fundraising committee (headed by Dr. Kevit Desai and Alice Kande), Logistics Committee (headed by Eliza Mbatia and Phyllis Karimi) for their efficient and professional reviews of all submitted abstracts, and making sure that all logistics for this conference are in place. In the same breadth, allow me to salute CUE staff members (Reynold Njue, Stella Kiptoo, Silas Oure, Hyrine Matheka, Pius Walela, Linah Lilan, Zackary Waweru, Judith Oketch, and Francis Kibaru among others) who provided a round the clock support to all committees. I convey special appreciations for the amazing financial, materials and other support that we got the University and other sectors; and especially from the Commission secretary Prof David K. Some and all Commissioners.

In the coming days, I hope you will enjoy many cutting-edge scientific, educational, technological and medical presentations designed in the spirit of pushing the frontiers of science, technology and education in Africa. Your active participation in all the conference programs will leave permanent mark on the conference.

Dr. Eusebius J. Mukhwana *is the Deputy Commission Secretary, Planning Research and Development, Commission for University Education in Kenya and Chairman, Local Organizing Committee. Email: Emukhwana@cue.or.ke*

Table of Contents

VISION

Accessible, Relevant and sustainable quality university education

MISSION

To regulate and assure quality University Education by ensuring compliance to the Act, regulations, standards, and guidelines for global competitiveness.

General information

The Commission for University Education (CUE) in collaboration with the Society for the Advancement of Science in Africa (SASA), Local Universities and Research institutions are pleased to invite you to take part in the Status Conference on Higher Education in Kenya whose theme ***'Quality University Research &Innovation'***

CONFERENCE ADVISORS

1.	Prof. David K. Some	Chairman
2.	Prof. Paul Wainaina	Ag. VC, Kenyatta University
3.	Prof. Richard Mibey	VC, Moi University
4.	Dr. Moses Rugutt	CEO, NACOSTI
5.	Dr. Kipkirui Langat	CEO, TVET-A
6.	Mr. Charles Ringera	CEO, HELB
7.	Prof. Mumo Kisau	VC, Scott Christian University
8.	Dr. Kevit Desai	LIWA
9.	Dr. George Ombakho	Director of Research, LIWA
10.	Dr. Julius Jwan	DG, KICD
11.	Dr. Eusebius Mukhwana	CUE, Secretary

LOC MEMBERS

1.	Prof. David Some	CUE	25.	Mariam Osman	UNEP
2.	Dr. Eusebius Mukhwana	CUE	26.	Brian Waswala	UNEP
3.	Dr. JPR Ochieng'- Odero	ERF	27.	Catherine Mbaisi	NEMA
4.	Prof. Ratemo Michieka	KNAS	28.	Dr. Penina Masibo	APHRC
5.	Dr. Kevit Desai	LIWA	29.	Linah Lilan	CUE
6.	Dr. Stephen Karimi	NACOSTI	30.	Adrian Mugambi	CUE
7.	Dr. Nicholas Ozor	ATPS - NET	31.	Hyrine Matheka	CUE
8.	Dr. John Ayisi	MOEST	32.	Silas Oure	CUE
9.	Mary Wachira	HELB	33.	Pius Walela	CUE
10.	Dr. William Otta	TVET-A	34.	Reynold Njue	CUE
11.	Prof. Francis Wambalaba	USIU-A	35.	Alice Kande	CUE
12.	Prof. Jackson Too	CUE	36.	Prof. Anne Nangulu	CUE
13.	Eliza Mbatia	CUE	37.	Prof. Walter Oyawa	CUE
14.	Phyllis Karimi	CUE	38.	Joseph Musyoki	CUE
15.	Linah Lilan	CUE			
16.	Prof. Madara Ogot	UON			
17.	Rosemary Omwadho	UON			
18.	Prof. Grace Bunyi	KU			
19.	Prof. Simon Onywere	KU			
20.	Prof. Vincent Onywera	KU			
21.	Prof. Marion Mutugi	UoKabianga			
22.	Dr. Hussein Ali	UMMA			
23.	Dr. Mercy Gichora	KEFRI			
24.	Dr. Lucy Ogol	KICD			

Conference Sponsors

Diamond Sponsors

Platinum Sponsors

Gold Sponsors

Bronze sponsors


KICD


TECHNICAL AND VOCATIONAL EDUCATION
AND TRAINING AUTHORITY

Keynote speakers Biographies

Keynote speakers for the Status of Higher Education and Society for the Advancement of Science in Africa: Dr. Fred Matiangi CS, Prof.Collette A. Suda PhD,FKNAS,CBS, Prof. Henry Thairu, Prof. David K. Some, Prof. Peter F. Mbithi, Prof. Paul Wainaina, , Prof. Kabiru Kinyanjui, Dr. Moses Rugutt, Dr. Juma Mukhwana, Dr. Kipkirui Lang'at, Dr. Innocent Mugisha – Rwanda, Prof Alexandre Lyambabaje , Prof. Calestous Juma, Prof. Harry Kaane, Prof Ozol Nigeria, Professor Benjamin Chukwuma Ozumba, Jeff Clovis, Dr. Manu Premchand Chandaria OBE EBS

Dr. Fred Matiangi is a Kenyan academic who is the Cabinet Secretary Ministry of Education Science and Technology and the former Cabinet Secretary for the ministry of Information, Communication and Technology. He is a former lecturer at Egerton University and the University of Nairobi. Dr. Fred Matiangi has held research and programme implementation positions in local and international organisations. He worked as a consultant for, among others, the World Bank, the Commonwealth Parliamentary Association, the Inter-Parliamentary Union and the United Nations Development Programme. He is a governance and programme implementation expert and a former country director of the Kenya Parliamentary Support Programme. By the time of his appointment, Dr Fred Matiangi was the Eastern Africa regional representative for the Centre for International Development, Rockefeller College of Public Affairs and Policy, the State University of New York.

Prof.Collette A. Suda, PhD,FKNAS, CBS is the Principal Secretary in State Department of Science and Technology in the Ministry of Education Science and Technology. She received her PhD in Rural sociology from the University of Missouri-Columbia in 1986. Since then she taught and conducted research on Women in Development,

Social change and Development and Agricultural Development policies, Programmes and projects. She was one of the coordinators of the Women Studies Project until 1999 when she was appointed Director of the Institute of Anthropology, Gender and African studies a position she held until 2002. Her scholarly publications include a chapter in a book on *National Heritage: Resource and Development Management* edited by R.A. Obudho and H.W.O. Okoth-Ogendo, which variously focus on changes in gender roles and relations, theoretical issues in social change, rural development in Kenya, and policy issues in comparative agricultural development in Kenya and Tanzania.

Prof. Henry Thairu is the Chairman of the Commission for University Education. He is also an Advisory board member at the Sustainable and Holistic African Development Alliance (SHADA). Prof. Thairu is the founding and former Managing Director of Jomo Kenyatta University of Agriculture and Technology (JKUAT) Enterprises LTD, a company for training and commercialization of University developed Innovations.

Prof. David K. Some is the Current Commission secretary of the Commission for University education. He has previously served as a Vice Chancellor of Moi University, Eldoret. Prof. Some serves as a Director at Family Bank Limited. He has a wealth of experience in leadership and management. Prof. Some serves on several boards and advisory committees. He holds a Doctorate in Agricultural Engineering from the University of Newcastle- upon Tyne in the UK.

Professor Paul. Kuria Wainaina is the current acting Vice-Chancellor at Kenyatta University. He holds Bachelor of Education (Honors) from the University of Nairobi. He completed his graduate training from the same University where he obtained his MA majoring

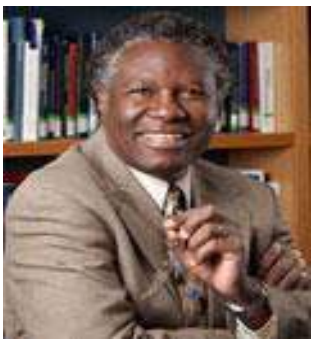
in Philosophy of Education. He later completed his PhD in Philosophy of Education from the University of Alberta, Canada where his research focus was on axiological and epistemological foundations of education.

He is a keen philosopher with extensive research work on Ethics in Education. Prof. Wainaina has risen through the academic ranks; from Lecturer to Full Professor. He has been elected Dean, Faculty of Education, University of Namibia, in the Republic of Namibia. He has also served as Chairman, Department of Educational Foundations Management, University of Namibia, in the Republic of Namibia.

Prof. Wainaina was the founding Chairman, Department of Educational Foundations at Moi University. Prior to his appointment as acting Vice-Chancellor, Kenyatta University, Prof. Wainaina has served in various positions within the University including being a member of the Kenyatta University Management Board and University Council. He has also served as a member of the Kenyatta University Staff Pension Scheme as well as Acting Deputy Vice-Chancellor (Administration), Acting Deputy Vice-Chancellor (Academic Affairs), and Deputy Vice-Chancellor (Administration), Kenyatta University.

He has over thirty-three years of teaching and research at the University level and has authored several academic papers and book chapters in the area of Philosophy and Philosophy Education, an area he is very passionate about.

Prof. Peter Mulwa Felix Mbithi is the Vice-Chancellor, at the University of Nairobi and Professor of Veterinary Surgery, University Of Nairobi (UoN). In 2005 he was competitively appointed as Deputy Vice-Chancellor, Administration and Finance, a position he held until 2015. He was appointed the Vice Chancellor University of Nairobi January 6, 2015. He has supervised MSc students and PhD students and has published extensively in peer-reviewed journals and is a member of several professional organizations.



Prof. Calestous Juma is a Professor of the Practice of International Development and Director of the Science, Technology, and Globalization Project at the Belfer Center for Science and International Affairs and Faculty Chair of the Mason Fellows Program. He also directs the Center's Agricultural Innovation Policy in Africa Project and Health Innovation Policy in Africa projects funded by the Bill and Melinda Gates Foundation. He serves as Faculty Chair of the Edward S. Mason Fellows Program as well as Faculty Chair of the "Innovation for Economic Development" and "Technology, Innovation and Entrepreneurship in Africa" executive programs. Juma is a former Executive Secretary of the UN Convention on Biological Diversity and Founding Director of the African Centre for Technology Studies in Nairobi. He co-chaired the African Union's High-Level Panel on Science, Technology and Innovation. He is on the jury of the Queen Elizabeth Prize for Engineering, the Africa Prize for Engineering Innovation, and the Africa Food Prize. Dr. Juma has been elected to several scientific academies including the Royal Society of London, the US National Academy of Sciences, the World Academy of Sciences, the UK Royal Academy of Engineering and the African Academy of Sciences. He has won several international awards for his work on sustainable development. He holds a doctorate in science and technology policy studies and has written widely on science, technology, and environment. Juma serves on the boards of several international bodies including the Aga Khan University and the Pan-African University. He is editor of the International Journal of Technology and Globalisation and theInternational Journal of Biotechnology. His new book, *Innovation and Its Enemies: Why People Resist New Technologies*, was published by Oxford University Press in 2016. His current book projects cover regional integration in Africa and innovation for economic development. Follow @Calestous on Twitter

Dr. Manilal Premchand Chandaria OBE EBS (Elder of the Burning Spear) is a Kenyan businessman of Indian descent born in Nairobi on 1 March 1929. Along with being the chairman and CEO of the Comcraft Group of Companies, a billion dollar enterprise that has a presence in over 40 countries, he is on the boards of several prominent East

African companies. He has won several awards in East Africa and internationally in recognition of his entrepreneurial endeavours and is also a noted philanthropist. In 2003, Chandaria was awarded the Order of the British Empire (OBE) by Queen Elizabeth II.In December of the same year, he was awarded the Elder of the Burning Spear by former president Mwai Kibaki, one of the highest civilian honours in Kenya. He has been hailed as "one of Kenya's leading industrialists

Professor John Wood CBE FREng is Secretary General of the Association of Commonwealth Universities. He graduated from the University of Sheffield in metallurgy and studied for his PhD at the University of Cambridge (Darwin College), where he subsequently stayed on as Goldsmith's Research Fellow at Churchill College.

In 1994, John was awarded a higher doctorate from Sheffield and has an honorary doctorate from the University of Cluj-Napoca in Romania, where he is also a 'citizen of honour'. He has held academic posts at the Open University, followed by the University of Nottingham, where he was Dean of Engineering. From 2001-2007, he was seconded from Nottingham to the Council for the Central Laboratory of the Research Councils as Chief Executive, where he was responsible for the Rutherford-Appleton and Daresbury Laboratories, in addition to shareholdings in ESRF, ILL and the Diamond Light Source. During this period, he was a visiting professor at the University of Oxford and still remains a fellow of Wolfson College, Oxford.

John then joined Imperial College London, first as Principal of the Faculty of Engineering, and subsequently as Senior International Advisor. He is still a visiting professor at Imperial. John is a non-executive director of a number of companies, including Bio-Nano Consulting, and sits on the advisory board of the British Library. Currently, he is on the board of the Joint Information Services Committee (JISC), responsible for the UK academic computing network, and chairs their Support for Research Committee. He is also involved with a number of charities, including acting as chair of the International Network for the Availability of Scientific Publications (INASP).

John was a founder member of the European Strategy Forum for Research Infrastructures and became chair in 2004, where he was responsible for producing the first European Roadmap. He became the first chair of the European Research Area Board in 2008, responsible for high level advice to the European Commission and in 2009 produced a long-term strategic vision entitled Preparing Europe for a New Renaissance.

He was elected as a fellow of the Royal Academy of Engineering in 1999, and is currently a member of their Council and International Committee. John was made a Commander of the British Empire in 2007 for 'services to science', and in 2010 was made an Officer of the Order of Merit of the Federal Republic of Germany.

Dr. Moses Kipngeno Rugutt (BVM, MSC, PhD, HSC) is currently the Director General of National Commission for Science, Technology and Innovation. He joined NACOSTI in 2010 having previously worked with Kenya Agricultural Research Institute in its Animal Health programme. He holds a Bachelor of Veterinary Medicine (BVM) University of Nairobi, a Master's degree in Tropical Veterinary Science and a Ph.D. in Veterinary Parasitology from Glasgow University Veterinary School. Dr Rugutt has been a member of the Committee on Drug Registration of the pharmacy and Poisons Board since 1999. He is also a board member of the National Quality Control Laboratory, amongst others. Other than these, Dr. Rugutt has distinguished service to the country through a number of professional and community contributions

Dr. Kipkirui Langat PhD, FIETK-was appointed the first Director General of TVET Authority on 30th April 2015. He is joining the Authority with wealth of experience from both public and private sector. He has close to 20 years' experience in TVET sector having joined Rift Valley Training Institute as Assistant lecturer in the Department of Automotive Engineering in 1996. He was promoted to a position of lecturer and appointed head of Department in 1998. He joined Eldoret Polytechnic in

2002 as a lecturer in the Department of Mechanical Engineering before being appointed Deputy Dean of students a year later. In 2004 he joined Egerton University as a lecturer in the Department of Industrial and Energy Engineering. While in Egerton University, he was instrumental in implementation and reviewing Bachelor of Industrial Technology programme where he was programme coordinator, and Examination and Timetabling officer until 2008. In 2009, he was appointed programme coordinator for Twinning Programme between Western Michigan University, USA and Egerton University. He was also among a team of experts who developed Bachelor of Technology in Mechanical Engineering and Bachelor of Philosophy in Mechanical Engineering at the Technical University of Kenya. He was a subject panel for Diploma and Higher National Diploma in Mechanical Engineering between 1999 and 2004 at Kenya Institute of Education.

Dr. Innocent S. Mugisha is a researcher by experience and professional teacher who has taught at primary, secondary, college and university levels. For the last fourteen years, he has served the National University of Lesotho (NUL) and National University of Rwanda (NUR) in various capacities as tutor, head of department, external-examiner, project-coordinator and deputy-director of quality assurance. Mugisha holds a PhD, MA and BA in education. His research interests are in the fields of assessment, teaching and learning in higher education.

Prof. Dr.-Ing. Harry L. Kaane is the Executive Director, Four Up Industrial Services Ltd and an Associate Professor of Engineering, Moi University. Previously he worked in the ministry of Higher Education, Science and Technology as the Education Secretary. Prof Kaane has vast experience in Policy analysis and formulation in education and training and Public – Private- Partnerships. He is a Member of the Technical Committee and Steering Committee of the National Curriculum Reform and a technical advisor to the World Bank funded Secondary Education

Improvement Project. He also coordinated the drafting of the National Education Sector Plan (NESP) and the formulation of the recent policy on education and training and subsequent Acts of Parliament.

Jeff Clovis, Senior Director, Customer Education & Sales Support, Scientific & Scholarly Research, Thomson Reuters. Trained as a Biologist and then a Germanic language specialist and translator, Jeff Clovis has been working in the field of Information Sciences for the past thirty years at Thomson Reuters (formerly ISI and Thomson Scientific), holding a variety of positions for this period, mainly in Editorial Development, Product Production, Business and Technology Planning, Product Development, Business Development and finally Customer Education & Sales Support. He was jointly responsible for: the design of the Image based production system used in processing all journals and conference proceedings, the development of Web of Science and the Derwent Innovations Index, as well as responsible for the addition and development of BIOSIS Previews and CAB Abstracts from CABI Publishing on the Web of Knowledge platform. He is currently Senior Director, Customer Education & Sales Support and in this position is responsible for supporting all Web products and content available for Academic & Government markets in North America, Latin America, Europe, the Middle East & Africa – including all new tools and content added to the platform and all customer education activities for the Americas, Europe, the Middle East and Africa.

Mr. Charles M. Ringera is the Chief Executive Officer at the Higher Education Loans Board. He is a seasoned banker with over 23 years' practical banking experience that cuts across all facets of central and commercial banking. He formerly worked as a regulator with the Central Bank of Kenya (CBK) in various capacities, as a bank examiner, Kisumu Branch, Finance, Audit and National Debt. In 2006, he moved to KCB Group where he headed the Group Operational Risk and Compliance supporting – Kenya, Tanzania, Southern Sudan, Uganda, Rwanda and Burundi. Charles holds

Bachelors of Science in Applied Accounting from Oxford Brookes University and an MBA in strategic management from Moi University. He is a professional accountant holding a CPA (K) and a Fellow of Association of Certified Chartered Accountants, FCCA. He also holds an Advanced Diploma in Risk Management in Banking/Finance by KPMG Sweden.

Professor Benjamin Chukwuma Ozumba was appointed the Vice-Chancellor of the University of Nigeria, Nsukka in June 2014. Prior to that, he was Provost of the College of Medicine, University of Nigeria (2004 – 2008) and Consultant in the Department of Obstetrics and Gynecology, Faculty of Medical Sciences and Dentistry of University of Nigeria, a position he held for over twenty years.

He studied medicine at the University of Lagos (1973–1979) where he obtained his MD status. Subsequently, he gained his postgraduate qualifications from the Royal College of Obstetricians and Gynecologists in the United Kingdom in 1993 and College of Surgeons in United States of America in 1996. He was later appointed Dean of the Faculty of Medical Sciences and Dentistry University of Nigeria Nsukka, 2002 – 2004.

He has over thirty years of professional and administrative experience with considerable knowledge of project planning and management gained both in academia and the wider industrial sector.

Professor Ozumba is an established researcher of international repute with numerous publications in Health Policy, and General Gynecology. He is also author of a number of books and editorial member of several journals. He has presented seminar papers in international arenas on a wide range of topics including 'Provision of Health Related Millennium Development Goals (MDG) Services in Nigeria' at Abuja (2008), 'Malignant Diseases of the Female Genital Track in Enugu, Nigeria' in Cape Town, South Africa (2007), 'The burden of malaria to the poorest households at Orlando Florida, USA (2007)'.

Dr. Julius Jwan is the Director/CEO at the Kenya Institute of Curriculum Development (KICD). Prior to joining KICD, he was the Director – Programmes and Technical Services at the National Cohesion and Integration Commission (NCIC) for three years. Before then, he was a lecturer at Moi University for over thirteen years, rising from the position of a Tutorial Fellow to Senior Lecturer. Prior to joining Moi University, he was a teacher at Ongalo Secondary School and Kaimosi Teachers' Training College for cumulative six years.

Dr. Jwan holds a PhD Degree in Educational Leadership & Management from the UK. He also holds a Master of Science (MSc) Degree in Educational Research Methods-from the UK; a Master of Philosophy (MPhil) Degree in Education Communication & Management from Norway and another Master Degree in Linguistics from Moi University - Kenya where he also graduated with a Bachelor of Education Degree. He has attended several fellowships and short courses including: Procurement and Tendering Processes; and Senior Management Course for Public Officers (Kenya); Education for Sustainable Peace (Germany); Enhancing Governance and Financial Administration in Africa (Botswana); Transitional Justice and Governance in Africa (South Africa); Reconciliation as Process and Practice (Sweden); Democratic Governance for Development in Africa (Uganda), among others.

Dr. Jwan has published widely on educational leadership and management in international journals and book chapters. He has also published three books - two on educational leadership and management, and one on research methods. He is a winner of the Best Doctoral Thesis Award by the British Educational Leadership, Management and Administration Society (BELMAS) in 2011.

Prof. Anne Kisaka Nangulu is an Economic Historian in the Department of History, Political Science and Public administration, School of Arts and Social Sciences, Moi University, Eldoret, Kenya. She attained her Bachelor of Arts Degree (in History) from the University of Nairobi, Kenya, in 1986; Master of Arts (in History), University of Nairobi, in 1990; and PhD (outstanding PhD) in History, West Virginia University, USA, in 2001. She has taught at University since March 1989 - at Moi University (and West Virginia, August 1996 - May 2001, while undertaking PhD studies). Since March 1989, she has risen through the ranks - as Tutorial Fellow; Lecturer, Senior Lecturer, Associate Professor; and Professor of History (as from November 2011 to the present). She has served at Moi University in various capacities; Head, Department of History, Dean, School of Arts and Social Sciences, Director, Quality Assurance, Acting Deputy Vice Chancellor (DVC), Academic, Research &Extension and Secretary to Senate; and she is a "permanent" Member of the Moi University Senate (the academic organ of the University).

Prof. Nangulu has taught several courses at undergraduate, master and doctoral level. Successfully supervised graduate students at both master and PhD level; and guided them in research methodology and areas of specialization. She has published in refereed journals and book chapters (over 25 publications); and edited and co-edited books as well as presented scholarly papers at international conferences. Her publications and research areas are wide and varied based on a multi-disciplinary approach. Prof. Nangulu has also undergone training nationally and internationally in quality assurance and she is a qualified Quality Assurance Consultant, Trainer and Implementer in higher education. She is also the founder member and currently President of the Kenya Universities Quality Assurance Network (KUQAN); and Chair of the University Education Services Technical Committee at the Kenya Bureau of Standards. Moreover, she is Chair and Member of numerous academic and professional Associations; and has engaged in community service for the benefit of society.

She has participated in European Union Funded Projects - in proposal writing and implementation amongst them are**:** AfriQ'Units (EDULINK Project I): "Sustainability of Quality Culture in East African High Education Institutions through Centralized Units"– Focus: Training University Staff to Run Quality Units; ENRICH (EDULINK Project II), **"**Enhancing Energy Accessibility & Efficiency through Establishing Sustainable Science, Technology and innovation (STI) Support National Networks with a Regional Dimension in East Africa"**;** and SUCCEED Network (EDULINK Project II) – "East Africa Higher Education Network on Sustainable Energy and Energy Efficient Campus Development.

CONFERENCE PROGRAM

COMMISSION FOR UNIVERSITY EDUCATION

In collaboration with:

UNIVERSITIES AND RESEARCH INSTITUTIONS

1ST BIENNIAL CONFERENCE ON THE STATE OF HIGHER EDUCATION IN KENYA

Kenyatta University, Nairobi, Kenya.

22nd – 25th August 2016

Theme : "Quality University Research and Innovation"

21st AUGUST 2016: ARRIVAL OF GUESTS

Hosted by Commission for University Education

22ND – 25th , 2016

Time	DAY 1: MONDAY 22ND AUGUST 2016	EVENT MOVER	VENUE
07:00 – 08:00	**Registration**	Secretariat	
08:00 – 10:30	**Official Opening** Programme	Prof. David Some	KU Amphitheatre
	Welcoming Remarks **Prof. Paul Wainaina, Ag. *Vice chancellor, Kenyatta University***		
	Welcoming Remarks & Invites other CEOs (5 Minutes each) **Prof. David K. Some , Commission Secretary, CUE**		
	Remarks: Dr. John Muraguri, **KUCCPS**		
	Remarks: Dr. Moses Rugutt, **NACOSTI**		
	Remarks: Dr. Kipkirui Lang'at, **TVETA**		
	Remarks: Mr. Charles Ringera, **HELB**		
	Remarks : *Prof. H. Thairu, Chairman, Commission for University Education*		
	Remarks *: Prof. Collette Suda, Principal Secretary, Ministry of Education*		
	SPEECH & OFFICIAL OPENING OF THE CONFERENCE ***DR. FRED O. MATIANG'I,*** *Cabinet Secretary, MOEST*	Eliza Mbatia (CUE) /Prof. Grace Mbunyi (KU)	Outside KU Amphitheatre
	LAUNCH OF UNIVERSITY STATUS REPORT by Dr. Fred Matiang'i, *Cabinet Secretary, MOEST*		
	Photo Session	Eliza Mbatia/John Mutethia, CUE	

	Plenary Session 1*:* Keynote Addresses: Status of University Education		KU-Amphitheatre
11:00 – 11:20	**Dr. Eusebius Mukhwana, Deputy Commission Secretary, Planning Research and Development, Commission for University Education (CUE), Kenya:** *The State of University Education in Kenya*	**Chair:** Prof. Henry Thairu, Chairman Commission for University	

		Education, Kenya	
11:20 – 11:40	**Prof. Alexander Lyambabaje, Executive Secretary, Inter-university Council of East Africa:** *Higher Education in East Africa: Creating an Educational Hub*	**Rapporteur:** Dr. Peace Agufana/Isaac Gathirwa, CUE	
11:40 – 12:00	**Prof. John Wood, Secretary General, Association of Commonwealth Universities:** *Envisioning a 21st Century University: The Global Perspective*		
12:00 – 12:20	**Dr. Helmut Blumbach, Director, DAAD Regional Office for Africa, Nairobi:** *Internationalization of Higher Education: The case of Kenya-Germany*		
12:20 – 13:00	**Plenary Discussion on Keynote Addresses - Discussants:** *Eusebius Mukhwana, Alexander Lyambabaje, John Wood, Helmut Blumbach*		
DAY 1: Lunch Break			

Plenary Session 2*: Role of Research in Policy Making and National Development*			KU Amphitheatre
14:00 – 14:20	**Dr. Onu Ogbonaya, Minister of Science & Technology, Nigeria – Session Keynote Speaker:** *Translating Research into innovations*	**Chair:** Prof. Prof. Ratemo Michieka, University of Nairobi **Rapporteur:** Hyrine Matheka/ Angela Nyang'era, CUE	
14:20 – 14:40	**Prof. Peter M. F. Mbithi, VC, University of Nairobi** - *Building Globally Competitive Universities for Africa: experiences from the North and the South* – ***Session lead speaker***		
14:40 – 15:00	**Dr. Moses Ruggut, CEO, National Commission for Science, Technology and Innovation (NACOSTI):** ***Harnessing the potential of Science, Technology and Innovation in Kenya***		
15:00 – 15:20	**Prof. Ben Ozumba, VC , University of Nigeria, Nsukka – Session Keynote Speaker:** *Transforming Africa's Development Agenda through Research to Innovations*		
15:20 – 15:50	**Dr. Kipkirui Langat, Director General, TVETA:** *Linking Vocational Education with University Education in Kenya: Challenges and Opportunities*		
15:50 – 16:30	**Plenary Discussion on Keynote Addresses - Discussants:** *Onu Ogbonaya, Peter M. Mbithi, Moses Rugutt, Ben Ozumba,, Kipkirui Langat*		
16.30- 17.30	**Visit to exhibitions/Posters**		
Health Break & End of Day 1			

18:00-	***THOMSON REUTERS OEPENING DINNER AT***	Coordinator: Prof.	KUCC –

20:00	***KENYATTA UNIVERSITY***	Grace Bunyi (KU) and Prof --- (CUE)	Open Ground

Time	**DAY 2: TUESDAY 23RD AUGUST 2016**	**EVENT MOVER**	**VENUE**
07:00 – 08:30	**Registration**	**Secretariat**	

DAY 2 Plenary Session*: Evolution and Status of Higher Education*			KU-Amphitheatre
08:30 – 08:50	**Prof. Calestous Juma, Harvard University – Lead Speaker:** Global Competition in Higher Education: Lessons for Africa	**Chair:** Prof. Francis Aduol (VC Technical University of Kenya) **Rapporteur:** Dr. Lucy Ogol, Kenya Institute of Curriculum Development (KICD)	
08:50 – 09:10	**Charles Ringera, CEO, Higher Education Loan Board (HELB), Kenya – Lead Speaker:** *Sustainable Financing of Higher Education In Kenya: Lessons and way forward for Africa.*		
09:10 – 9:30	**Prof. Harry Kaane, Ministry of Education Science and Technology/Moi University - Lead Speaker:** History and *Future of Higher Education in Kenya*		
09:30 – 9: 50	**Mr. John Muraguri, CEO, KUCCPS – Lead Speaker:** *Evolution of the Placement service for students to Universities and Colleges in Kenya: Lessons* and way forward for Africa		
009:50 – 10:10	**Jeff Clovis, Thomson Reuters – Lead Speaker**: *From research to innovation in Africa: Developing indicators to understand the translation of academic research to innovation in Africa*		
10:10:– 10:50	**Plenary Session Discussion 1 (Q & A) - Discussants:** *Charles Ringera, Harry Kaane, John Muraguri and Jeff Clovis*		
10:50-11:20	**Health Break**		

DAY 2 Morning Parallel Session 2.1*: Assuring Quality in Higher Education*			KU-BSCC 012
11:20 – 11:35	**Prof. Anne Nangulu, Deputy Commission Secretary (Quality Audit & Standards), CUE**, - **Session lead speaker:** *Quality Assurance in University Education in Kenya and Benchmarking with International Practices: The Role of Universities and Commission for University Education*	**Chair:** Prof K Kipngeno, University of Kabianga **Rapporteur:** Phyllis Karimi /Monica Gachunga	
11:35 –	**John P. Bwire, Kenyatta University (KU):** *The*		

11:50	*Place and Quality of Parallel Programs in Institutions of Higher Learning: A Case for Kenyatta University and St. Paul's University* -		
11:50 – 12:05	**Arun Datta, Technical University of Kenya:** *Knowledge and Attitude of Secondary School Students about TVET*		
12:05 – 12:20	**Purity W. Muthima & Edward Kanori, Kenyatta University & UoN:** *Demand Factors influencing Alternative mode of study: A Case of University of Nairobi External Degree Programme*		
12:20 – 12:35	**Alice Kande, J. Too & E. Mukhwana, Moi University***: University Funding in Kenya: Status, Challenges, effects on Quality and Prospects*		
12:35 – 13:05	**Parallel Session 2.1 Discussion of the presentations (Q & A)**		
13:05 – 14:00	**DAY 2: Lunch Break**		

DAY 2: Morning Parallel Session 2.2: *Evolution and Status of Higher Education 11*			KU-BSCC 014
11:20 – 11:40	**Dr. Julius Jwan, CEO, KICD - Session Lead Speaker -** *Re-Aligning Higher Education Curriculum with the 21st Century*	**Chair:** Prof. Simon Onywere, Kenyatta University **Rapporteur:** James Kiarie/Hudson Nandokha ,CUE	
11:40 – 12:00	**Beatrice A. Bunyasi & Paul K. Mbugua, Kenyatta University:** *Accessibility to Higher Education by students with disabilities: The Case of Kenyatta University*		
12:00 – 12:15	**K'Owino Isaac O. Masinde Muliro University of Science and Technology (MMUST), Kenya,** *Health and Safety in The Kenya Higher Education Institutions*		
12:15 – 12:30	**Lillian C. Boit, Kenyatta University:** *Employability skills and job opportunities for the Graduate: The Role of Higher Education Institutions*		
12:30 – 12:45	**Dr. Lucy Ogol, Kenya Institute of Curriculum Development (KICD):** *Studying approaches among Technical Education students, Nairobi, Kenya*		
12:45 – 13:05	**Parallel Session 3 Discussion of the presentations (Q & A)**		
13:05 – 14:00	**DAY 2: Lunch Break**		

	DAY 2: Morning Parallel Session 2.3: *Quality of Post Graduate Research and Training I*		KU-BSSC 280
11:20 – 11:40	**Prof. Peter Ngure, APHRC *Session lead Speaker*: *Expanding The Africa Postgraduate Training Arena*: *lessons and way forward***	**Chair:** Prof. Vincent Onywera, Kenyatta University **Rapporteur:** Sarah Ooro/Elizabeth Onyango,CUE	
11:40 – 12:00	**Prof. Ambassador. Ruthie Rono, USIU (A) – Session Lead Speaker**: *Quality of Post Graduate Research Training in Africa*		
12:00 – 12:15	**Peter A.M Mwaura, Kenyatta University:** *Points of Concern in the Quality Standards of Academic Research in Kenya: Implication to University Research Pedagogy*		
12:15 – 12:30	**Dorothy N. Kyalo, Angeline Sabina Mulwa & Adeline M. Mbith, University of Nairobi,** *Research training in Africa: Re-Defining Post Graduate mentoring for Quality Outcome in Higher Education*		
12:30 – 12:45	**Kebeya Hilda, Kenyatta University,** *Promoting Academic Integrity: A Survey of Selected Postgraduate Programs at Kenyatta University*		
12:45 – 13:05	**Parallel Session 2.3 Discussion of the presentations (Q & A)**		
13:05 – 14:00	**DAY 2: Lunch Break**		

	DAY 2: Morning Parallel Session 2.4: *Sustainability of Funding Education & Research in Africa*		KU-BSSC 281
11:20 – 11:40	**Prof. Dr. F.W.O Aduol, Technical University of Kenya – Session Lead Speaker** - *Differentiated Unit Cost And Its Application: Potential Impact On Kenya's Higher Education*	**Chair:** Prof. Francis Wambalaba **Rapporteur:** Dr. Benter Atieno, Technical University of Kenya/Pius Walela, CUE	
11:40 – 12:00	**Dr. Alex Ezeh, Executive Director, Executive Director of the African Population and Health Research Center (APHRC) – Session Lead Speaker:** *Landscape of Research and Development in Africa: Challenges and Opportunities*		
12:00 – 12:15	**Prof. Vincent O. Onywera, Kenyatta University:** *Strategic Partnership for enhanced Research, Innovation and Uptake: The KIDSCAN Research Alliance*		
12:15 – 12:30	**Rono Kiplangat & Christopher Omusula, Kenyatta University,** *Sustainable Funding of Science Based Courses: A Prerequisite to Attainment of Technical Knowledge and Skills for Industrialized Africa*		

12:30 – 12:45	**Muganda Manini and Umulkher Ali Abdillahi, MMUST:** *Sharia Compliant Student Loan-Backed Securitization for Higher Education Loans in Kenya*		
12:45 – 13:05	**Parallel Session 2.4 Discussion of the presentations (Q & A)**		
13:05 – 14:00	**DAY 2: Lunch Break**		

	DAY 2: Morning Parallel Session 2.5: *Building Sustainable Globally Competitive Higher Education Institutions I*		KU-BSSC 152
11:20 – 11:40	**Prof Meoli Kashorda, KENET - Session lead speaker:** *Trends in Training of Engineering students in Kenya: lessons for Reaching vision 2030*	**Chair:** Prof. Walter Oyawa **Rapporteur:** Dr. Hussein Ali, UMMA/Gertrude Mabele,CUE	
11:40 – 12:00	**Prof Shem Wandiga, Centre for Science and Technology Innovations- Session lead speaker:** *Forging Strategic Higher Education Linkages for Development*		
12:00 – 12:15	**Priscilla Wanjiku Ndegwa, Kenyatta University:** *Effectiveness of Performance Contracting Processes in Promoting Higher Education in Universities in Kenya*		
12:15 – 12:30	**John O. Shiundu, James B. Ouda & Rose A. Opiyo, MMUST:** *Governance in Higher Education: Leadership Prospects and Challenges of Public Universities in Kenya*		
12:30 – 12:45	**Simon Onywere, Solomon Mwenda, Victor Okoth, Alex Asige and Benson Mwangi, Kenyatta University:** *Kenyatta University's Journey towards Empowering the University community with Spatial Thinking and Practical Skills for impact oriented problem solving*		
12:45 – 13:05	**Parallel Session 2.5 Discussion of the presentations (Q & A)**		
13:05 – 14:00	**DAY 2: Lunch Break**		

	DAY 2: Morning Parallel Session 2.6: *NICHE Session: Promoting Quality University Education PhD Students Session, Sponsored by NICHE Project*		KU-BSSC 273
11:00 – 11:15	**Gilbert Opanga**: *Tracking Student Experiences as Universities in Kenya*	**Chair:** Prof. Adrian Hoffman, University of Groningen	
11_15 –	**Elizabeth Onyango**: *Are we meeting Market*	**Rapporteur:** Leah	

11:30	*expectations? Graduate Tracer Studies in Kenya*	Kaburu/Gilbert Opanga, CUE	
11:30 – 11:45	**Lynette Kisaka**: *Fostering Gender and Diversity at Public Universities in Kenya*		
11:45 – 12:00	**Hudson Nandokha**: *Assuring the Quality of Teacher Education Programs in Kenya*		
12:00 – 12:15	**Hyrine Matheka**: *Monitoring and Evaluating Universities in Kenya: New Frontiers*		
12:15 – 12:30	**Benson Gatubu**: *Governance and its impact on the Quality of University Education in Kenya*		
12:30 – 12:45	**Monica Gachunga**: *Ranking and Rating: Is Kenya Ready for it?*		
12:45 – 13:00	**Isaac Gathirwa**: *Policy and Legal reforms in Kenya and their impact on the Growth and Quality of University Education in Kenya*		
13:00 – 13:15	**Pius Walela**: *Using MIS to improve management in the University Sector in Kenya*		
13:00 – 13:30	**Parallel Session 2.6 Discussion of the presentations (Q & A)**		
13:00 – 14:00	**DAY 2: Lunch Break**		
	DAY 2: Afternoon Parallel Session 2.7: *Evolution and Status of Higher Education 11I*		KU-BSSC 014
14:00 – 14:20	**Henry O. Ayot & Samson O. Ondigi, Kenyatta University – Session Lead Speaker:** *The Genesis of School of Continuing Education at Kenyatta University Through Self-Sponsored Programme and its effects on Education in Kenya*	**Chair:** Prof. Madara Ogot, University of Nairobi	
14:20 – 14:35	**Prof. Jan Deinum, University of Groningen:** *Developing a data collection system for Kenya: Lessons and experiences*	**Rapporteur:** Jackson Wachira Muthengia, Embu University College, Kenya/ Benson Gatubu CUE	
14:35 – 14:50	**Benjamin Kyalo Wambua, Moi University:** *Research Utilization among University Academic Staff in Kenya: A Case of Education, Arts and Social Sciences*		
14:50 – 15:05	**Catherine N. Nandain, Technical University of Kenya:** *Uncertainty in Universities in Kenya: The Role of Public Relations Function*		
15:05 – 15:20	**Christine Wasanga and Merecia Anne Sirera, Kenyatta University:** *Towards evidence based approach in education policy-making for socio-political and economic development in Kenya*		
15:20 – 15:35	**Ezra Maritim & Fred Keraro, Egerton University:** *Mainstreaming Open and Distance Learning in Higher Education in Kenya: Prospects and Challenges*		

15:35 – 16:00	**Q & A Session**		
16:00 – 16:30	**Health Break**		
	DAY 2: Afternoon Parallel Session 2.8: *Quality of Post Graduate Research and Training I*		KU-BSSC 012
14:00 – 14:20	**Beatrice Maina, APHRC – Session Lead Speaker**: *The contribution of student leadership to PhD training in Africa: Examples from Consortium for Advanced Research Training in Africa program*	**Chair**: Prof James Kung'u, Kenyatta University **Rapporteur:** Dr Susan Wasike, MMUST/prof. Marcella Mwaka, CUE	
14:20 – 14:35	**David Nandasaba Musuya, and Mary M Waruguru, Kibabii University:** *Knowledge Management Practices and Sustainable Research in Kenya.*		
14:35 – 14:50	**Fuchaka Waswa, Akunga Daniel, Makori Obonyo, Mahiri Joseph, Itolondo Winfrida, Kenyatta University:** *Interrogating the Harmonized Promotion Criteria for Human Development in the Context of Sustainable Quality Assurance in Kenya's University Education*		
14:50 – 15:05	**G.A Owiti, Egerton University:** *A Utilitarian Approach to Analysis of Education in Kenyan Public Universities*		
15:05 – 15:20	**George Mathenge Wairungu, Kenyatta University:** *Qualitative Research in Special Education: Most Common Errors Made by Graduate Students and Beginning Researchers in preparation, data collection and data analyses Phases of Research.*		
15:20 – 15:35	**Gladys J. Mengich, MMUST,** *Identification of Competencies for Professional Training: A Case Study on Physiotherapy Course at the Kenya Medical Training College, Nairobi*		
15:35 – 16:00	**Q & A Session**		
16:00 – 16:30	**Health Break**		
	DAY 2: Afternoon Parallel Session 2.9: *Quality of Post Graduate Research and Training II*		KU-BSSC 280
14:00 – 14:20	**Jackson Too, Alice Kande & Silas Oure, Commission for University Education (CUE) – Session Lead Speaker:** *Staffing Needs in Higher Education: The Fluidity of Gender and Ratio Dynamics in the University Sector*	**Chair:** Joseph Musyoki, CUE	
14:20 – 14:35	**Hellen Kiende and Mukirae Njihia Kenyatta University:** *Adequacy of post graduate research methodology training: a case of the School of Education, Kenyatta University*		

14:35 – 14:50	**Henry N. Kemoni, MMUST:** *Postgraduate Quality Education and Research at Masinde Muliro University of Science and Technology, Kenya*	**Rapporteur:** Jean Claude Zigama, University of Eldoret/Michael Tanui, CUE	
14:50 – 15:05	**Isaac. Mwangi, Kenyatta University:** *ICT integration in higher education: a comparison of policies and practices in Kenyan universities*		
15:05 – 15:20	**J. M. Kihoro, Elizaphan M. Maina , Peter N. Ndirangu, and John Kanyaru, Kenyatta University:** *Transforming Examinations processing and Management at Universities: An ICT Solution*		
15:20 – 15:35	**Grace Bunyi, Martin Ogola, Mukirae Njihia & Joyce Wangia, Kenyatta University:** *Trends and Status of Social Science Post-graduate Research Training in Kenya*		
15:35 – 16:00	**Q & A Session**		
16:00 – 16:30	**Health Break**		
	DAY 2: Afternoon Parallel Session 2.10: *Building Sustainable Globally Competitive Higher Education Institutions I*		KU-BSSC 281
14:00 – 14:20	**James Biu Kung'u, Kenyatta University – Session Lead Speaker:** *Overcoming Challenges in University Education in Africa in the 21st century*	**Chair:** Prof Dickson S. O. Owiti, MMUST	
14:20 – 14:35	**Julius K. Maiyo, Kibabii University:** *Assessment of Lecturers Perceptions on Students-Lecturers Evaluations in Higher Education Institution in Kenya*		
14:35 – 14:50	**Kaumbulu Fredrick Kyalo, Esther Njeri Njoroge Kisii University:** *Translating Academic Research into Innovation; Implementation of Academic Studies in To Policy and Practice in Kenya*		
14:50 – 15:05	**Kyalo B. Wambua, Moi University,** *Assessment of Research Utilization among University Academic Staff In Kenya: A Case of Education, Arts and Social Sciences*	**Rapporteur:** Aloys Mosima Osano, Maasai Mara University// Valeria Onsando, CUE	
15:05 – 15:20	**Leah Wanjama, Kenyatta University:** *Transforming the Academic Curriculum for Advancing Science, Technology and Innovation: A Reflection on the status of inclusion of women and girls in Science, Technology and Innovation in Kenya Public Universities*		
15:20 – 15:35	**Lynette G. Kisaka, Jackson K. Too and Eusebius J. Mukhwana, Commission for University Education (CUE):** *The Gap between policy making and Implementation in Higher Education Sector in Kenya*		
15:35 – 16:00	**Q & A Session**		

16:00 – 16:30	**Health Break**		
	DAY 2: Afternoon Parallel Session 2.11: : *Evolution and Status of Higher Education 1V*		KU BSCC 273
14:00 – 14:20	**Madara Ogot, University of Nairobi – Session Lead Speaker:** *Is the Research Agenda of Kenyan Universities aligned to realizing Vision 2030?*	**Chair:** Dr. Rose Okoyo Opiyo, University of Nairobi **Rapporteur:** Michael Lusinde, CUE	
14:20 – 14:35	**Maina M, Njeri N., Musundire R., Muasya R, Mezzetti B., Stuetzel H., Bua B. , Kenyatta University:** *Developing teaching and curriculum skills of university academic staff: lessons from the EDULINK-ESA project*		
14:35 – 14:50	**Maina Mwangi, Kenyatta University:** *Strategies for strengthening research competitiveness in African Higher Education Institutions*		
14:50 – 15:05	**Tirus Muya Maina, Murang'a University College:** *An Audit of ICT Funding on Effective Integration of ICT's In Selected TVET Institution in Kiambu and Murang'a County, Kenya*		
15:05 – 15:20	**Onesmus Muroki wa Thuo, Kenyatta University:** *Translating Academic Research into Innovation: Assessing the Relationship Between Development and Innovation Policy and University-based Innovation for Knowledge-based Development in Kenya*		
15:20 – 15:35	**Harriet Njui, Riara University:** *Transforming University Education through inclusive Classrooms*		
15:35 – 15:50	**Agnes M. Gachau, Technical University of Kenya:** *Unpacking the link between University Programs and Employability through Graduate Tracer Studies: Case of TU-K*		
15:50 – 16:15	**Q & A Session**		
16.15-17.00	**Visit to Exhibitions and Posters**		
17:00 – 17:30	**Health Break**		

POLICY HOT SEAT

Time	DAY 3: WEDNESDAY 24TH AUGUST 2016	EVENT MOVER	VENUE
07:30 – 08:30	**Registration**	**Secretariat**	

	Plenary Session		KU-BSCC 014
08:30 - 08:40	**Dr. Eusebius Mukhwana; – Introduction of pertinent issues Affecting university Education in East Africa**.	**Chair:** Dr. Eusebius J. Mukhwana, DCS PRD **Rapporteur:** Prof. Jackson. Too CUE	KU-Amphitheatre
08:35 – 09.00	**-5 Minute pronouncements on Pertinent issues in the University Sector** • Prof. Innocent Mugisha, Higher Education Council, Rwanda • Prof. David Some, CUE, Kenya • Prof. Peter Mbithi, University of Nairobi • Dr. Kevit Desai, Linking Industry with Academia • Prof. Ezra Maritim, Egerton University/Former Cahir CHE • Prof. Alexandre Lyambabaje, IUCEA		
09.00-11.00	**Policy Hot Seat: Engagement between Panel members and the Audience (live coverage)**		
10:40 - 11:00	**Health Break**		

	DAY 3: SHE Parallel Session 3.1: Sub–Theme 2: Promoting Science & Technology Research		KU-BSCC 014
11:00 – 11:20	**Dr. Evans Kituyi**, **IDRC - Session Lead Speaker:** *Linking Research with technology Development and transformation of lives*	**Chair:** Dr. Stephen Karimi – NACOSTI **Rapporteur:** Monicah Ngendo KUCCPS	
11:20 – 11:35	**Joseph Musyoki, Commission for University Education**, University Accreditation systems in Kenya: Ensuring relevance and Employability of Graduates		
11:35 – 11:50	**Abubakar, K., Jude, J., Yusuff, A. S,.Emmanuel, O. G., National Centre for Technology Management (NACETEM), Nigeria:** *Driving Collaboration for Innovation in Nigeria Manufacturing Industry*		
11:50 – 12:05	**Dr. Beatrice Odera -Kwach, CUE**, Changing information systems and their impacts on the Quality of University Education in Kenya.		
12:05 - 12:20	**Dulo Nyaoro, Peace Institute, Moi University:** *Participatory Development Approach – Completing Participation Circle to Reduce Adverse Effects of Development in Kenya*		
12:20 – 12:35	**Ongera Gilbert, University of Kabianga:** *Promoting science and technology education for all: A challenge for African Countries*		

1235 – 1300	**Visit Exhibitions site**		
DAY 3: Lunch Break			

	DAY 3: SHE Parallel Session 3.2: Sub-Theme 6: Transforming the Academic Curriculum for Advancement of Science, Technology and Innovation		KU-BSCC 012
11:00 – 11:20	**Dr. Sylvance A. Sange, KIPI Session Lead Speaker** - *Trends and evolution in patenting and other protections in Kenya*	**Chair:** Prof. Marion Mutugi	
11:20 -11:35	**Yusuff, A. S, Jude, J., Abubakar, K., & Emmanuel, O. G., 1National Centre for Technology Management (NACETEM), Nigeria:** *Redesigning Tertiary Institution Academic Curriculum in Science, Technology, Engineering and Mathematics (STEM) Subjects for an Improved Science, Technology and Innovation (STI) Practice in Nigeria-*	**Rapporteur:** Dr. Benson Murgor, CUE	
11:35 – 11:50	**Elizabeth Were, Kenya Methodist University:** *Enhancing Innovation Through Postgraduate Research Supervision: Challenges and Prospects-*		
11:50 – 12:05	**Dickson S. O. Owiti, MMUST:** *Curriculum Innovation: The Key to Quality STEM Education for Development in Africa Under the 21st Century Sky -*		
12:05 – 12:20	**Jackson Too & Mureithi Njeru, Moi University:** *A False Start of Science and Technology in Africa: The Case of Kenya*		
12:20 – 12:35	**Jean Claude Zigama, & Jackson Too, University of Eldoret:** *One Laptop Per Child in Kenyan Primary Schools: Moving From Toys to Thinking Tools*		
12:35 – 13:00	**Visit Exhibitions site**		
13:00 – 14:00	**DAY 3: Lunch Break**		

	DAY 3: SHE Parallel Session 3.3: *Sub: – Theme 1: Engaging International Science & Technology collaborations, Linkages and Partnerships*		KU-BSSC 280
11:00 – 11:20	**Prof. Wellington Otieno, Director RESTECH** - ***Session Lead Speaker***: A *Model of Research Cooperation*	**Chair:** Prof. Eucharia Kenya	
11:20 -11:35	**Gichana James Ongwae, Jomo Kenyatta University of Agriculture and Technology (LKUAT), Kenya:** *Towards Improving Sustainable Funding of Research in*	**Rapporteur**: Dr Benjamin K. Wambua, Moi	

	Science, Technology, Innovation and Entrepreneurship for Development in Africa	University	
11:35 – 11:50	**Emilio Ovuga, Gulu University, Uganda:** *Positioning SHE in Africa's Development*		
11:50 – 12:05	**James, J. I., Yusuff, A. S., Abubakar, K. Emmanuel, O. G, National Centre for Technology Management, NACETEM, Naigeria:** *Assessing the Impact of International Science and Technology collaborations on the Health Sector in West Africa – The Case of Ebola in Nigeria*		
12:05 – 12:20	**Emmanuel, O., Jude, J., Yusuff, A. & Abubakar, National Centre for Technology Management, NACETEM, Naigeria:** *Promoting R & D in Nigerian Small and Medium Scale Enterprises*		
12:20 – 12:35	**Macharia N. Anthony, Kenyatta University:** *Potential Benefits of Using Teaching Kits in Inquiry-Based Learning in Geosciences*		
12:35 – 13:00	**Visit Exhibitions site**		
13:00 - 14:00	**DAY 3: Lunch Break**		

	DAY 3: SHE Parallel Session 3.4: ***Sub–Theme 4: Addressing Human Capital priorities for a technologically driven nation***		KU-BSSC 281
11:00 – 11:20	**Kevit Desai**, **LIWA - *Session Lead Speaker****: Linking Industry with Academia: The journey we have travelled and lessons for the future*	**Chair:** Millicent Omukaga, Commissioner CUE	
11:20 – 11:35	**Oigo, E. Bosibori & Isika, Juliet K.:** *Clothing and Textile Research in Kenya: Challenges and Opportunities*	**Rapporteur:** Ken Ntongondo, CUE	
11:35 – 11:50	**Leon Mutesa, University of Rwanda, Kigali, Rwanda,** *New Innovative intervention and Evidence Towards Malaria Elimination in Rwanda: Experience from MEPR Project in Ruhuha Sector in Bugesera (2011-2016)*		
11:50 – 12:05	**Isika, Juliet K:** *Building and Sustaining Globally Competitive Fashion Design Education: Resources in the Use of Garment Design by Draping*		
12:05 – 12:20	**Gabriel Juma Okumu & Simmy M. Marwa, Dedan Kimathi University of Science and Technology, (DKUST), Kenya:** *Human Capital Development Priorities for a technologically Driven Nation*		
12:35 –	***Exhibition site/posters***		

13:00			
13:00 – 14:00	**DAY 3: Lunch Break**		

	DAY 3: SHE Parallel Session 3.5: *Sub– Theme 5: Accelerating Research Infrastructure and Human development*		KU-BSSC 152
14:00 – 14:20	**Mohammed Kerre**, **PERC PACE - *Session lead Speaker*:** *Developing a Science and technology platform for EA*	**Chair:** Dr. Francis Kibaru **Rapporteur:** William Mwangi, /Mary Jullie Achieng CUE	
14:20 – 14:35	**Peter Kinyae Musyimi, Karatina University:** *Understanding Drought Characteristics for Sustainable Development in Kenya: A Case Study of Makindu Sub-County, Kenya*		
14:35 – 14:50	**Stephen Frimpong, Bekele H.Kotu, Shaibu, Mellon Bedi, International Institute of Tropical Agriculture, Socioeconomics, Ghana:** *Understanding Smallholder Farming Behavior Under Sustaining Intensification Technologies in Marginal Hotspots in Ghana*		
14:50 – 15:05	**Suad M. Sulaiman & Salih A. Hamadto, Sudanese National Academy of Sciences (SNAS):** *Addressing Food Security Issues in Developing Countries Through Solar Cooking and Drying*		
15:05 – 15:20	**Mwarimu Alfred, Kenyatta University:** *Access To Safe And Clean Drinking Water Through Household Connection In The Fast Developing Towns In Nairobi County*		
15:20 – 15:35	**Jonathan Olak, Ryan Simpson and Morris, DC Komakech, York University Canada:** *Report Card Guru: The Ultimate Virtual Innovation to Integrating Schools and Community*		
15:35 – 16:00	**Q & A Session**		
16.00-17.00	**Visit to exhibitions/Posters**		
16:00 – 16:30	**Health Break**		
18.00-20.00	**CUE DINNER AT UTALII HOTEL, THIKA ROAD, NAIROBI**		

	DAY 3: SHE Parallel Session 3.6: *Sub– Theme 3:*	KU-BSSC

	Translating academic research into innovation		273
14:00 – 14:20	***Dr. John Ayisi, MOEST*** *– Commercialization of Research Outputs* ***– Session Keynote Speaker***	Chairperson: Dr. Dorcas Omukhulu CUE **Rapporteur:** Lynette Kisaka, CUE	
14:20 – 14:35	**Jackson Wachira Muthengia, Karanja wa-Thiong'o & Gerald Muthakia, Embu University College, Kenya:** *An Overview of Alternative Cementing Materials, Kenyan Case*		
14:35 – 14:50	**Muchira Irene Wanjiku, Kenyatta University:** *Crystallization Kinetics of InSe Chalcogenide Glasses for Phase Change Memory (PRAM) Applications*		
14:50 – 15:05	**Waswa J, Ngugi L.W. Asiko L A & Ambani R, Karatina University:** *A Paradigm Shift in Social Vulnerability to Nutritional Diseases. A Perspective*		
15:05 – 15:20	**Adeyemi, A.,Ademola, Ajibade, A., Yusuff .A 1National Centre for Technology Management (NACETEM):** *Innovative Approach Towards Curbing The Spread of Tuta Absoluta in Northern Nigeria: Lessons from Research Institutes in Some Selected Countries*		
15:20 – 15:35	**David Mutegi Marikah, Wanyika Harrison & Erastus Gatebe, JKUAT:** *Novel Materials from Clay and Functionalized Clay Nanoparticles: Application on Remediation of Lead, Cadmium and Pentachlorophenol from Water*		
15:35 – 16:00	**Peter Conic Awory, Moi University:** *Using Polyethylene to Produce Methane and Ethane Gases – Applications for Lighting and Heating*		
16.00-17.00	**Visit to exhibitions/Posters**		
1600 – 16:30	***Health Break***		
18.00-20.00	**CUE DINNER AT UTALII HOTEL, THIKA ROAD, NAIROBI**		

	DAY 3: SHE Parallel Session 3.7: ***Sub – Theme 2: Promoting Science & Technology Research in Africa***		KU-BSCC 014
14:00 – 14:20	**Mr. Tirop Kosgey, Chairman, National Research Fund Board** *– Development of National Research Fund in Kenya.*	**Chair:** Prof. John Shiundu	
14:20 – 14:35	**Benard Muok and Willis Makoka, Jaramogi Oginga Odinga University of Science and Technology (JOOUST):** *Accelerating pico-solar market in Kenya:*	**Rapporteur:** Brian Waswala UNEP/ David	

	Role of research and innovation	Ajuoga CUE	
14:35 – 14:50	**Shadrack Mule, University of kabianga:** *Translating innovations into economic growth: rationale for an innovation strategy*		
14:50 – 15:05	**I. W. Simiyu, Great Lakes University of Kisumu:** *Towards Exploring the Link Between Science, Technology and Innovation in Advancing Africa's Sustainable Development Agenda: A Case Study of Mobile Money Technology in Kenya*		
15:05 – 15:20	**Madara Ogot and James Nyangay, University of Nairobi:** *Greenhouse Gas Emissions Abatement Potential in Kenya from Introduction of Feebates*		
15:20 – 15:35	**Josephine Kagunda, Theresia Marijani, Gerald Mligo & Marily Rono, University of Nairobi:** *Modeling the Effects of Temperature Variation on Schistosomiasis Transmission Dynamics*		
15:35 – 16:00	**Q & A Session**		
16:00 – 16:30	***Health Break***		
18.00-20.00	**CUE DINNER AT UTALII HOTEL, THIKA ROAD, NAIROBI**		

	DAY 3: SHE Parallel Session 3.8: ***Sub– Theme 2: Promoting Science & Technology Research in Africa***		KU-BSCC 012
14:00 – 14:20	**Wesley K. Kirui, Shubiao Wu, Simon Kizito, Pedro N. Carvalho, Renjie Dong:** *Pathways of nitrobenzene degradation in horizontal subsurface flow constructed wetlands: Effect of intermittent aeration and glucose addition*	**Chair:** Prof. Anne Nangulu, Quality Audit & Standards, CUE	
14:20 – 14:35	**C.A. Omukoko, L.Turoop, S.V.W. Wekesah, K.N. Maniania and Ghimire, JKUAT:** *Screening of Beauveria bassiana Isolates for Endophytic Activity – Effects on Growth of Tomato Varieties*	**Rapporteur:** Zachary Waweru CUE	
14:35 – 14:50	**Kilemba Lucas M., University of KwaZulu-Natal, South Africa:** *Management and Preservation of Indigenous Knowledge for Food Security and Natural Resources by Selected Rural Communities in Kenya*		
14:50 – 15:05	**Miheso-O'Connor, Marguerite, K., Kenyatta University:** *Using technology to support special needs learners access stem related courses in higher education:*		

	An exploratory study among low vision learners.		
15:05 – 15:20	**Ngugi, C.N., Waturu, C.N., Wepukhulu, S.B., Nguru, J.K., Kamau, L.G., Kimani, A.W and Wangoh, R.W:** *:Determination of the Effect of Transgenic and Conventional Gypsophila root Exudates on Infectivity and Development Entomopathogenic Nematodes*		
15:20 – 15:35	**Alexander Kinyua Wachira, Meru University of Science and Technology:** *Enhancing Performance of Agribusiness Through an Automated Inter-County Commodity Exchange Market in Kenya*		
15:35 – 16:00	**Martha,Odhiambo, Catherine W. Muui, & Mukiri Githendu, Kenyatta University:** *Effects of Organic and Inorganic Fertilizers on Seed Quality of Upland Nerica Rice Varieties in Siaya County, Kenya-*		
16:00 – 16:30	***Health Break***		
18.00-20.00	**CUE DINNER AT UTALII HOTEL, THIKA ROAD, NAIROBI**		

	DAY 3: SHE Parallel Session 3.9: ***Sub– Theme 2: Promoting Science & Technology Research in Africa***		KU-BSCC 280
14:00 – 14:20	**Riany Kenneth,Kivati Chris and Abaki Zipporah:** *Role of Research Information Management Systems (RIMS) on Promoting Science & Technology in Research Institutes of Kenya*	**Chair:** Prof A. S, Yusuff, NACETEM, Nigeria **Rapporteur:** Dr. Peter K. Musyimi, Karatina University/ Geoffrey Wanjala	
14:20 – 14:35	**Judith Mang'eni, Moi University:** *Risk factors for malaria infections in fever hot-spots and cold-spots in high transmission region in Western Kenya*		
14:35 – 14:50	**Stephen Wandera, Makerere University**: *Determinants of access to healthcare by older persons in Uganda*		
14:50 – 15:05	**Linda Nyondo, University of Malawi:** *Strategies for early access to HIV services for heterosexual men in Blantyre Malawi*		
15:05 – 15:20	**Anne Khisa, University of Nairobi**: *A grounded theory of regaining normalcy: health seeking behavior, coping and re-integration of women with obstetric fistula in Kenya*		
15:20 – 15:35	**Rose Opiyo, University of Nairobi:** *Food choice behaviors and dietary adequacy among pregnant women in Kenya*		

15:35 – 16:00	**Q & A Session**		
16:00 – 16:30	**Health Break**		
18.00-20.00	**CUE DINNER AT UTALII HOTEL, THIKA ROAD, NAIROBI**		

	DAY 3: SHE Parallel Session 3.10: ***Sub– Theme 2: Promoting Science & Technology Research in Africa***		KU-BSCC 281
14:00 – 14:20	**Nyile Erastus Kiswili, Shale Noor Ismail and Bellah Chepkulei, Jomo Kenyatta University of Agriculture and Technology:** *Role of Sustainable Procurement Practices on Supply Chain Performance of Manufacturing Sector in Kenya: A Case of East African Portland Cement Company*	**Chair.** Prof Fred Keraro, Egerton University **Rapporteur:** Alice Kande/Irene Kimaiyo, CUE	
14:20 – 14:35	**A.L Nyondo-Mipando, A.T Choko, A.F. Chimwaza and A.S. Muula, University of Malawi:** *Invitation Cards during pregnancy enhance male partner involvement in Prevention of mother to child transmission of Human Immunodeficiency Virus in Blantyre, Malawi*		
14:35 – 14:50	**Rose Okoyo Opiyo, Reuben Kamau Koigi, Anne Obondo, Dorington Ogoyi, Wambui Kogi Makau, University of Nairobi:** *Effect of Fish Oil Omega-3 Fatty Acids on Reduction of Depressive Symptoms among HIV-seropositive Pregnant Women: A Randomized Double-blind Controlled Trial*		
14:50 – 15:05	**Maurice Mutisya, Moses W Ngware, Caroline W Kabiru, Ngianga-Bakwin Kandala, African Population and Health Research Center:** *Effect of early childhood stunting on learning achievement among children from poor urban households in Nairobi, Kenya*		
15:05 – 15:20	**Dr Peter A. M. Mwaura :** *Towards translation of Universities into National Data Archives for research and economic development.*		
15:20 – 15:35	**Njiruh Paul Nthakanio, Embu University College:** *Opportunities In Bioeconomy as a template to Industrialization: A Lesson for Kenya to Learn*		
15:35 – 16:00	**Q & A Session**		
16.00-17.00	**Visit to exhibitions/Posters**		

16:00 – 16:30	**Health Break**		
18.00-20.00	**CUE DINNER AT UTALII HOTEL, THIKA ROAD, NAIROBI**		

	DAY 4: THURSDAY 25TH AUGUST 2016	**EVENT MOVER**	**VENUE**
07:00 – 08:30	**Registration**	**Secretariat**	
	Plenary Session: Agriculture and Food security		
08:30– 08:50	**Prof Adrian Mukhebi; *Session Keynote Speaker:*** *Africa is Rising, Is Agriculture Rising?*	**Chair:** Dr. Nicholas Ozor **Rapporteur:** Rosemary Omwandho, UON	KU-Amphitheatre
08:50 – 09:10	**Dr. Manu Chandaria, CEO, Comcraft Group of Companies - *Session Keynote Speaker*:** *Taking Africa to the Next Level: Experiences from Industrialist*		
09:10 – 09:30	**Dorothy Mukhebi, AWARD - Session Keynote Speaker**: *Training Women at Postgraduate levels in Agriculture: African experiences.*		
09:30– 09:50	**Dr. Fred Anampiu, IITA, - *Session Keynote Speaker:*** *Growing Africa's soils: lessons from the CGIAR*		
09:50 – 10:10	**Alfred Busolo, AFFA - *Session Keynote Speaker:*** *Reforms within the Kenyan Agricultural sector -*		
09:00 – 09:20	**Flora Mutahi, Chairperson, KAM – *Session Keynote Speaker:*** *Expectations of Academia in Transforming the Industry -*		
09:20 – 09:40	**Sebaggala M. Kigozi** - *Linking Industry with Academia in Uganda: Lessons and way forward*		
09:40 – 10:00	**Plenary Discussion (Q & A)**		
10:00 – 10:30	Exhibition Site/posters		
10:30-11:00	**Health Break**		

	DAY 4: SHE Parallel Session 4.1: *Sub – Theme 6: Transforming the Academic Curriculum for Advancing Science, Technology and Innovation*		KU-BSCC 014
11:00 – 11:20	**Alain L. Fymat, International Institute of Medicine and Science, California, USA:** *The Odyssey of Human Vaccination and Africa-*	**Chair:** Sergio Gonzalez, Springer NATURE	
11:20 – 11:35	**Moses Makokha Wandera, Cooperative University College of Kenya:** *Environmental Sustainability and Sustainable Development: A Global Compact Instrument Disclosure from African Universities*	**Rapporteur:** Dr Juliet Isaka, Kenyatta University:	
11:35 – 11:50	**Madara Ogot and James Nyangaya. University of Nairobi:** *How Many Vehicles are there on Kenya's Roads?-*		
11:50 – 12:05	**Waswa J, Ngugi L.W and Asiko L.A, Karatina University:** *Gender Disparity in Cognitive Abilities: A Nutrition Perspective*		
12:05 – 12:20	**Leon Mutesa, University of Rwanda, Rwanda:** *Advancement of Genetic Activities in Rwanda: Achievements, Challenges and Perspectives-*		
12:20 – 12:35	**Parallel Discussion (Q & A)**		
12:35 -13:00	**Exhibition site**		
DAY 4: Lunch Break			

	DAY 4: SHE Parallel Session 4.2: *Sub- Theme 5: Accelerating Research Infrastructure and Human development*		KU-BSCC 012
11:00 -11:20	**Martha Wakio Maina, Kenya Medical Research Institute:** *Improving Early Diagnosis of Cervical Squamous Intraepithelial Lesions sing P16^{INK4a} Marker on Cell Blocks from Cervical Smears*	**Chair:** Dr. George Ombakho, Ministry of Education	
11:20 – 11:35	**Lucy M. Ombaka, Patrick Ndung'u, Vincent Nyamori, Dedan Kimathi University of Technology:** *Nitrogen-doped carbon nanotubes as supports for Pd catalysts applied in the selective hydrogenation of aminobenzophenone*	**Rapporteur:** Dr. Shadrack Mule, University of Kabianga	
11:35 –	**J. Oduor, N. Onkoba, F. Maloba, W. Arodi & A. Nyachieo, Institute of Primate Research (IPR):** *A*		

11:50	*Comparative Study on Efficacy of Bacteriophage and Clindamycin Against Multi-Drug Resistant Staphylococcus aureus*		
11:50 – 12:05	**Ezekiel Mecha, Omwandho, Tineberg & Konrad, Justus-Liebig University, Giessen, Germany:** *The TGF-beta and TGF-beta Receptors in Endometriosis*		
12:05 – 12:20	**Idowu Temitope Ezekiel, Nyadawa Maurice, K'Orowe M. Odondi, Pan African University- Institute for Basic Sciences Technology & Innovation, JKUAT:** *Assessment of Groundwater Salinity and Impact of Seawater Intrusion on a Coastal Aquifer – North Coast of Mombasa as the Case Study*		
12:20 – 12:35	**Cynthia Nyunja, Joyce Maina, Joshua Amimo and Joseph Junga, University of Nairobi:** *The African Catfish: Population Characterization in Selected Cultured and Wild Populations in Kenya*		
12:35 – 13:00	**Monica A. Ayieko, Jaramogi Oginga Odinga University of Science and Technology:** *Processing and Consuming Edible Insects: Project Insefoods*		
DAY 4: Lunch Break			

	DAY 4: SHE Parallel Session 4.3: ***Sub- Theme 5: Accelerating Research Infrastructure and Human development***		KU-BSSC 280
11:00 – 11:20	**A.N. Mutsami , P. Okemo ,R. C. Cheruiyot , S. Kariuki , J. Ogutu & S. L. Symekhe, Kenyatta University :** *Antimicrobial Susceptibility Profile and Conjugation Characteristics of Escherichia coli Strains Isolated from Broiler and Indigenous Chicken in Kericho County*	**Chair:** Prof. Paul Mbugua, Kenyatta University **Rapporteur:** Reynold Nyaga/ Clifford Gicheru, CUE	
11:20 – 11:35	**Maloba, Mwangi, Kagira , Kivai, Ndere, Ngotho, Gicheru , Mbaruk & Akinyi, Kenyatta University:** *Zoonotic Malaria-Like Parasites in Baboons – A Human-Wildlife Interface Study*		
11:35 – 11:50	**Charles Ng'ong'a & Monica Awuor Ayieko, Jaramogi Oginga Odinga University of Science and Technology:** *Performance of Chicken Fed on Black Soldier Fly Pupae Raised on Biodegradable Kitchen Waste*		
11:50 – 12:05	**Benter Atieno, Technical University of Kenya:** *A Biorationale for Control of Vector Snails, Mosquitoes and Schistosome Larvae*		
12:05 -12:20	**Vitalis Ogemah, MMUST:** *The need for mainstreaming Sustainable Agriculture in African universities agricultural curricula-*		
12:20	**Thomas G. Egwang, Med Biotech Laboratories,**		

– 12:35	**Kampala:** *Malaria Vaccines in the Era of Malaria Eradication and SDG3.3*		
12:35 – 13:00	**Theresia Ndunda; Amos Mbugua; Kibet Shikuku ;Naomi Waiganjo** *Determination of Risk of Transfusion Transmitted Malaria Parasite among Blood Donations made at Kenyatta National Hospital, Blood Transfusion Unit*		
DAY 4: Lunch Break			

	DAY 4: SHE Parallel Session 4.4: ***Sub- Theme 5: Accelerating Research Infrastructure and Human development***		KU-BSSC 281
11:00 – 11:20	**Afuwai Gwazah Cyril, Federal University Dutsin-ma, Katsina State, Nigeria:** *Geophysical Investigation of the Causes Of Borehole Failure in the Crystalline Basement Complex: A Case Study of Kaura Area of Kaduna State, Nigeria*	**Chairperson:** Prof. Chacha, DVC, Maseno University **Rapporteur:** Pius Walela/Mureithi Njeru, CUE	
11:20 – 11:35	**Joseph Mwaniki Wambui, Edward Gichohi Karuri and Patrick Murigu Kamau Njage, University of Nairobi:** *Development by Fermentation and Utilization of a Safe and Stable Nitrosated Haemoglobin Pigment from Slaughterhouse Animal Blood*		
11:35 – 11:50	**Kuria M.W. , Ngumi V.W., Njenga P.K. and Wangai L N, Kabarak University:** *Maxent Modeling for Predicting Suitable Habitat for a Threatened Medicinal Plant Species, Strychnoshenningsii in Kenya*		
11:50 - 1205	**Ngugi MP, Njagi JM, Oduor RO, Ombori RO, Kibiti CM and Cheruiyot RC**: *RNAi-Mediated Knockdown of Cyanoglycosides in Selected Kenyan Cassava Genotypes*		
1205 – 12:20	**Aloys Mosima Osano , Prof. Eric R. Okong'o,Prof. Oyaro Nathan,Dr. Jackson Kiptoo, Maasai Mara University**: *Biofuel Synthesis from Waste Cellulosic Biomass Using Indigenous Salt Hydrolytic Catalytic Regimes. An Indigenous-Modern Technology Infusion.*		
12:20 – 12:35	**Diana Kayeke Lukalo:** *Oil Prices and the Real Exchange Rate: Empirical Evidence from South Korea and Kenya*		
12:35 – 13:00	**Mwarimu Alfred, Kenyatta University:** *Quality of Hypertensive Healthcare Services Among Patients Attending Level Five Public Hospitals in Nairobi County, Kenya*		
DAY 4: Lunch Break			

	DAY 4: SHE Parallel Session 4.5: ***Sub – Theme 7: Managing expectations of post-graduation employment***	KU-BSSC 152

11:00 -11:20	**Susan Wasike & Thomas Amukaya Andabwa, MMUST:** *Peace Education Curriculum for Sustainable Community Development in Kenya*- **Susan**	**Chair:** Dr. Mercy Gichora, Kenya Forestry Research Institute **Rapporteur:** Dr David Mutegi Marikah, JKUAT/Esther Gathungu, CUE	
11:20 – 11:35	**Joseph Hitimana, Eric K. Koech, Peter K. Sirmah, Zablone O. Owiti, Musa G. Apundo, Anne Sitienei, and A. Wachiye University of Kabianga:** *Scaling up training in forestry and environmental courses in Kenya: Reflection on Challenges and Opportunities in newly established Universities. A case of Kabianga*		
11:35 – 11:50	**Morris Komakech and Tanzina Islam, University of Toronto, Canada:** *The Global Sex Trafficking of Women & Children: A Public Health Challenge*		
11:50 – 12:05	**Wilson Hassan Nandwa, Umma University, Kenya:** *Engaging Religious Leaders in Environment Conservation*		
12:05 – 12:35	**Davis Bundi Ntwiga, University of Nairobi:** *M-Shwari Credit Scoring: Peer Group Borrowers versus Individual Borrowers-*		
12:35 – 12:50	**Victor Kamau, Josiah and Robert Mbeche, JKUAT:** *Assessment of the Technical Efficiency of smallholder Coffee Farming Enterprises in Murang'a, Kenya*		
12:50 - 13:00	**Josphat Kagema, Karatina University:** *The Condition of Schools' Infrastructures and Its Effects on Quality Learning Outcomes in Primary Schools In Kenya*		
DAY 4: Lunch Break			

	DAY 4: SHE Parallel Session 4.6: ***Greening Our Universities***		KU-BSSC 273
11:00 – 11:25	**Prof. George Ndegwa -** *Aligning the Higher Education Curricula with the Green Concept*	**Chair:** Catherine Mbaisi - NEMA **Rapporteur:** James Kimani, CUE	
11:25 – 11:50	**David Wang'ombe -** *Community Engagement in Greening the Environment*		
11:50 – 12:15	**Prof. David Mungai, Wangari Maathai Institute for Peace and Environmental Studies –** *Analysis of Environmental Sustainability Performance Contracting Targets and Development of Environmental Sustainability Indicators for Universities In Kenya*		
12:15 –	**Dr. Dorcas Otieno, Kenya Organization for Environmental Education** – *The Green Campus in Kenya*		

12:40			
12:40 – 13:00	**Nickson Otieno -** *Student Engagement in the Greening Agenda*		
DAY 4: Lunch Break			

DAY 4: Conference Wrap – up and Way Forward			KU-Amphitheatre
14:00 – 16:00	**Dr. Eusebius Mukhwana – Chair LOC, Closing Remarks** **Prof. David Some, CEO, CUE- Closing Remarks** **Dr. Manu Chandaria, Chair, Comcraft, Closing Remarks**	**Chair:** Aduda – Nation Media Rapporteur: Linah Lilan, CUE	
16:00 – 16:30	**Prof. Henry Thairu, Chair, CUE, Official Closing of the Conference**		

ABSTRACTS

Linking Vocational Education with University Education in Kenya

Dr. Kipkirui Langat, Phd, Fietk

Director General-TVETA

Abstract

Kenya is currently training more engineers and scientists than technicians and artisans. This is despite the fact that ideally, one engineer requires 3 technologists, 12 technicians and 60 artisans to work effectively. The imbalance can be eliminated by forming a close collaboration between Universities and TVET institutions to train a proportional number of personnel with appropriate skills for effective industrial development. Additionally, the current curriculum in TVET institutions and Universities places more emphasis on theory at the expense of practical skills. This has led to production of graduates with inadequate skills required in industries. In order for Kenya to achieve its industrialized nation status as envisioned in its economic blueprint – the Vision 2030, it is necessary to make a big revolution on the way TVET and University programs are implemented. Such a transformation will equip trainees with the necessary skills required in the 21st century since some of the skills that are currently taught have become obsolete. The three main notable goals that were adopted by world leaders during the 17 Sustainable Development Goals (SDGs) in September 2015 included poverty eradication, decent work and economic growth and industry, innovation and infrastructure. The achievement of these goals requires a strong TVET sector. The global UNESCO TVET Strategy is to ensure that learning needs of all youth are in line with all stakeholders. UNESCO is supporting member states in reforming TVET systems to possess sustainable and necessary skills attained through impartial access to appropriate innovation, Technology and skills for life. Since current education statistics show that only about 6% of Kenyan children joining standard one proceeds to University, there is need to strengthen the TVET sector to impart the necessary skills to the bulk of the Kenyans (94%) who enter the job market without University qualification. This can be achieved through an

organizational capacity building which includes sufficient financial, technical expert skills and human resources required for effective implementation of TVET strategy. A general clear guideline should also be developed by Universities for vertical academic progression of the TVET graduates.

Quality Assurance in University Education in Kenya and Benchmarking with International Practices: The Role of Universities and Commission for University Education

Prof. Anne Nangulu,
Deputy Commission Secretary (Quality Audit & Standards)
Commission for University Education & Professor of Moi University,
Contact: Phone No. + 254 (0) 733870502 anangulu@gmail.com and anangulu@cue.or.ke

Abstract

The objectives of University Education include advancement of knowledge through teaching, scholarly research and scientific investigation; and to promote the highest standards in offering quality education and relevance of programmes. While enhancing equity accessibility to university services; and produce quality graduates/human resource equipped with knowledge, competencies and skills to meet the market demands through employability for the benefit of humanity and society at large. Therefore, to meet the objectives of university education, universities in Kenya both public and private; and the Ministry of Education through Commission for University Education as a regulatory body, have put in place quality assurance mechanisms to enhance standards and sustain a culture of offering quality education despite the challenges. Likewise, stakeholders amongst them students and university staff; professional bodies; regional organizations for example the East Africa Community through Interuniversity Council for East Africa (IUCEA); the African Union; Quality Assurance Networks and Associations; and Development Partners all have a stake in ensuring quality university education, since graduates and related university products (including medical and technological innovations among others) are consumed in Kenya and beyond for the benefit of the global society. This brings in the role of benchmarking for international best practices, bearing in mind that admission requirements to university and university qualifications awarded by individual

universities or in collaboration with partnering institutions must conform to international conventions of which Kenya is signatory. In this case, the transnational nature of stakeholders and consumers of university education and related products call for investment in university education, in terms of quality human resource, infrastructural development and quality assurance services, which makes it an expensive venture. It then calls for financial commitment and collective responsibility from various partners including government, international organizations, development partners, research institutions, industry and non-governmental organizations among others to sustain quality university education. Thus, sustaining quality assurance mechanisms in university education calls for joined effort to be able to implement quality standards that entails recognition, accreditation and quality audit of university programmes to assure the public and employers, both public and private including industry among others, that university graduates and related products meet the needs of society; bearing in mind national, regional and global competitiveness and related dynamics.

The Place and Quality of Parallel Programs in Institutions of Higher Learning: A Case for Kenyatta University and St. Paul's University

Dr John Peter Bwire,
Lecturer , Kenyatta University
Email: **Johnpeterbwire@gmail.com**, **john_bwire@yahoo.com**

Abstract

The purpose of this work is to investigate the role parallel programs play and their qualitative impact both on this institutions and opportunities offered to students. Parallel programs have drastically opened more learning avenues for disadvantaged students whereas creating overloads to lecturers. These mixed blessings seem to compromise on quality but provide more funds to run institutions. This work analyses the evolution and status of University education with a view to providing suggestions towards balancing between opportunities available for students and quality education in the said Institutions. Qualitative design and research methods such as purposive and random sampling shall be used to gather both primary and secondary data. Hypothetically, evolution and development of education in the Universities has to meet

contemporary local dynamics of market demand but must be structured to meet quality and sustainable global standards.

Knowledge and Attitude of Secondary School Students about TVET

Dr. Arun Datta; arundatta16@gmail.com
Technical University of Kenya

Abstract

Kenya should become an industrialized nation by 2030. Besides the entrepreneur, the human input for industry is in the form of management and skilled workforce. Dictionary meaning of 'skill': *an ability to do something well, especially because you have learnt and practiced it.* TVET is geared towards that. National policies and Visions can be achieved if the population concerned, comprehends and is willing to work in that direction. In the case of tertiary (higher) education, it is the school leavers who should understand what TVET stands for and be willing to pursue it. A brief survey was conducted in April, 2015, involving a few secondary school students, teachers, PTA and BOG members. Most of the parents, PTA and BOG members were aware of TVET and associated it with easy employability. However, they felt that such jobs are low and don't pay well. The general impression was that TVET programs are for those who don't do well in KCSE. The students were found to be completely confused and even ignorant, even if some of them had vocational guidance. A degree qualification is seen as prestigious, well-paying and desirous. Most students have vague, wrong or no knowledge about what TVET entails. They want to become professionals and a degree is the only, certain way. It was concluded that there is a strong need to make school leavers aware of the options and to portray TVET in a positive light. If the TVET institutions can attract students with analytical abilities, they can fulfill their mandate better and the National goals can be achieved.

Demand Factors Influencing Alternative Mode of Study: A Case of University Of Nairobi External Degree Programme

Dr Purity W. Muthima & Mr Edward Kanori
Department of Educational Management Policy and Curriculum Studies
School of Education

Kenyatta University and University of Nairobi
Email -puriwate@gmail.com and muthima.purity @ku.ac.ke
Mobile no. 0721 913 595

Abstract

The demand for Higher Education has been so high such that face-to-face universities cannot accommodate the entire students who want higher education through the regular programme. Student enrollment has been processes for years that enable students get opportunities of learning in higher levels.The purpose of the study was to investigate the factors influencing enrollment of students of University of Nairobi in the External Degree Programme. The study sought to establish the levels of disposable income, expected income upon completion of Bachelor of Education Degree, private pecuniary returns to education and gathered other factors that influenced students enrollment in external degree programme in the University of Nairobi. Four research questions were formulated to guide in the study. The study aimed :to establish if there was any relationship between private pecuniary returns to education (non-monetary gains) and enrollment in external degree programme in the University of Nairobi; to find out if there was any relationship between the level of disposable income and students enrollment in external degree programme of University of Nairobi; to find out if there was any relationship between expected raised income and enrollments in external degree programme of University of Nairobi and research question four sought to establish if there were other factors influencing enrollment in external degree programme of University of Nairobi.The study employed Correrational and descriptive survey and data was collected by use of questionnaires. The findings revealed that there was a relationship between private pecuniary returns to education and students enrollment. There was a relationship between expected raised income and enrollments. There was a positive relationship between disposable income and student enrollment in external degree programme. There were other factors that influenced the students into joining the external degree programme. Such factors included encouragement from friends, the feeling and understanding that education was an investment other than consumption, a way of advancing in the teaching profession, a way of self enhancement and self-development, as way of getting salary boost and promotion. Based on the findings it was concluded that there was a relationship between private pecuniary returns to education and enrollment, there was a relationship between expected raised income and

student enrollment in external degree programme, there was a positive relationship between disposable income and enrollment to the external degree programme and lastly it was concluded that there were other factors that influenced the students into joining the external degree programme. In the light of the research findings the researcher recommended that more loan facilities should be available to students so as they can enroll in the external degree programme. It was also recommended that there should be proper laid out strategies to assist students complete their courses in the expected time frame also that the government should have policy that allows student and teachers who have graduated from the Primary Teachers Training colleges joining external degree programme without having to wait for three years as the University policy states.

University Funding in Kenya: Status, Challenges and Prospects

Alice Kande[1], Prof. Jackson Too[1, 2] & Dr. Eusebius Mukhwana[1]

Commission for University Education;

Moi University

Abstract

Education is globally recognized as a key force for modernization and development and hence the need for an educated populace. There is robust evidence that as the highest level of education, the university sector plays a key complementary role in provision of knowledge and relevant skills which are critical in fostering sustainable economic and social development of a country. In Kenya, education and training is expected to be the principal catalyst towards realization of Vision 2030 and, cognizant of this, the government has made tremendous progress in the recent past to enhance access – an initiative that has resulted in an increase in the number of institutions as well as enrollments at all levels of education. The Kenya university sector, in particular, has witnessed explosive progression topping the list in the African region besides South Africa, from a single university college at independence, to the current seventy (70) public and private universities across the country. Enrollment similarly increased from 2,000 in 1970 to over 500,000 in 2015. The expansion of the sector has demanded a proportional increase in allocation of resources and despite being one of the sectors that has continued to receive the bulk

of budgetary resources over the years, for instance, with the current allocation of 23% of the national budget in the FY 2016/2017, the sector still runs short of the global 26% benchmark.

The inadequacy of the government capitation has prompted exploration of more innovative and sustainable funding mechanisms over the years, which has seen the institutions adopt various mechanisms such as public-private–partnerships, increased efforts in research grants and endowments, increased entrepreneurial activities, varied tuition fees, bank loans among other internally financed generating mechanisms. Despite the efforts, the majority of the universities as indicated by a recent survey conducted by the Commission for University Education (CUE) operate with a deficit, which is a major concern in the country. Needless to say, the majority of those affected are institutions which mostly offer STEM related programs. The much anticipated implementation of Differentiated Unit Cost (DUC) is expected to bring equity in university funding while granting universities the autonomy to set their own fees based on the uniqueness of their programs.This paper is largely based on desktop research, which gives a trajectory of university funding over the years and triangulated by data obtained from a survey conducted by CUE in all the public and private Universities. The paper highlights pertinent issues on the existing university financing mechanisms, challenges and opportunities, and examines the policy discourse that has shaped funding trends of the sector in the country. The paper concludes by providing some policy recommendations taking into account the mounting challenges of the rapidly expanding university sector.

Keywords*: University education; Vision 2030; university funding, Differentiated Unit Cost,public universities; private universities*.

Accessibility to Higher Education by Students with Disabilities: The case of Kenyatta University

Dr. Bunyasi B. A. and Prof. Paul k. Mbugua

Kenyatta University

Abstracts

This paper surveys a brief history of Special Needs Education in Kenya before getting into the challenges associated with disabilities as they affect access to higher education by persons with disabilities (PWDs). The whole spectrum of the provisions made by Kenyatta University (KU) and the unique structures put in place are highlighted as catalysts that attract more students to enroll here. It is hoped that some of the key practices will be passed on to other players of Higher education as KU plays her role of education provision to PWDs. Various bodies that may help in greater access are also stated and their roles listed. The paper concludes by stating the way forward to all stakeholders in Education for PWDs. A great future awaits those who venture into this exclusive area, whose import affects all peoples irrespective of social-economic status and other related histories.

Health and Safety in the Kenya Higher Education Institutions

K'Owino Isaac O.

Department of Pure and Applied Chemistry, Masinde Muliro University of Science and Technology, Kakamega, Kenya

Email: ikowino@mmust.ac.ke/ikowino@gmail.com

Abstract

This paper presents the main challenges facing Kenya's public higher education institutions as healthy, secure and safe learning environments. It proposes concrete policy steps that the decision makers and educational stakeholders can take to ensure higher education institutions prepare the country's human capital in a clean and safe environment in line with The Kenya Constitution 2010 and sustainable Development Goals. It draws its conceptual framework from feasible security and environmental health concerns overlooked while the country makes effort to implement the Universities Bill 2014 in various counties. Primarily, in creating new universities and colleges in these counties, the latest efforts focusing in Turkana County, the government envisages that the large population in University communities will bring development and growth of small business cities of social and economic benefits to local communities and the nation at large. However, the tragic event of attack on students by Al-Shabaab militants at Garissa University College point to imminent threats faced by higher education institutions. Besides, universities perform many of the same functions as the small

cities ranging from operating research laboratories, business enterprises and small startup industries, to disposing of trash and waste, and supplying drinking water and food to the environment. As a result, college and university communities become increasingly exposed to carelessly disposed chemicals and wastes, unmonitored emissions, and countless other security issues that require regular inspections and audits by relevant government agencies.This paper discusses the role of a centralized University Environmental Health and Safety Program in compliance and noncompliance with many of the safety regulations. It argues that Kenya can and should draw useful policy lessons from the success stories of industrialized economies (United States of America, Japan and Britain) where higher education institutions have systematically integrated health and safety in university courses and are viewed to continue providing a secure, clean, healthy and safe environment that has attracted many foreign student investments.Data collection involved documentary review and site visits. The recommendations discussed will provide important insight into how Kenya's policy planners and higher education leaders might transform the security and safety standards of public higher education institutions to globally acceptable levels.

***Keywords**: Occupational health and safety; university education; global standards; Kenya*

Employability Skills and Job Opportunities for The Graduate: The Role Of Higher Education Institutions

Lillian C. Boit

Kenyatta University, Department of Educational Management Policy & Curriculum Studies

Abstract

Introduction: Higher education in Kenya has grown exponentially with23 public universities and 17 chartered private universities. The student enrolment has also tripled putting a strain on available resources for teaching, learning and research. The public universities previously dependent wholly on government subsidy, has since resorted to admitting self-paying students to augment the budget. The Academic division, Directorate of Students, and the Career Development, and Placements are charged with grounding the student with skills in readiness for employment. The academic division manages the curriculum, ensuring that professional

standards such as the mute courts for lawyers, the engineers and teachers have been met or are they? Student Affairs develops the soft skills such as relational, leadership, and communication. While the Careers development and placements invite employers and entrepreneurs to introduce the world of work to students. The three divisions provide a gestalt experience with skills for the student from the university. This paper will therefore inquire into practices at Kenyatta University that aim at increasing prospects of employability of graduating students. Higher education status therefore is informed by employability skills of the graduating student.

***Keywords**: Skills, employability, higher education, graduates*

Studying Approaches among Technical Education Students, Nairobi, Kenya

LUCY OGOL (PhD)

Kenya Institute of Curriculum Development

Abstract

Research in Europe and the Far East reveal that studying approaches contrasts (surface, strategic and deep) depict future learning orientations of students in higher education. According to that research those students who adopted the 'deep' contrast, interpreted as transformative learning, were more successful learners than those who adopted the 'strategic' who focused on current achievement of high grades. The rapid global, technological, economic and social changes, occurring in the 21st century, demand early identification of the Technical Education (TE) students' orientations. This is especially so as TE is critical to socio-economic development and global competitiveness after training. An exploratory research study was conducted to establish the studying approaches that students by gender adopted in TE Graphic Arts (GA), in Kenya. The study involved 120 Technical Education GA students at Kenya Polytechnic University College and Buru Buru Institute of Fine Arts, which offer government GA developed courses in Nairobi County. A closed-ended questionnaire and an observation schedule adapted from the Approaches to Study Skills Inventory for Students (ASSIST) were used to collect data. Cronbach alpha was .707. Data were analyzed using ANOVA and the significance value of 0.10 and above determined the null hypothesis. The study established that means by gender indicated significant statistical differences, in the uncertainty ($p<.009$), focus on minimum requirements ($p<.028$), linkages to prior

knowledge (p<.019) and critical assessment of validity (p<.012). Female students scores were more inclined towards the strategic approach. The study recommends enhancement of gender-sensitive pedagogy to inculcate deep studying approaches for quality and sustainable learning improvement among both sexes.

Points of Concern in the Quality Standards of Academic Research in Kenya: Implication to University Research Pedagogy

Dr Peter A. M. Mwaura

Kenyatta University

Abstract

One of the cardinal roles of higher education is the creation of knowledge through research and the application of the same in solving national and global issues. This determines not only the quality of training that takes place and the linkage between the university and the socio-economic development of a Nation, with a consequential definition of quality of a university. While quantification of the studies undertaken in university is important as an indicator of research efficiency, the quality of these studies undertaken is more critical in defining their potential usability and impact. Quality of the research undertaken has also become the major factor determining academics' promotion and fund allocation to universities. What quality research should look like has been discussed by many researchers and many research focused authors including Furlong &Oancea (2005),Shavelson& Towne, (2002),Bryman (2006), Carter & Little (2007), Creswell (2005), and Shohamy (2004).While each of the Kenyan universities can give a claim of many researches being undertaken by both lecturers and their postgraduate students, there are relatively limited studies focusing on the quality of these researches. The purpose of this paper is to examine the various areas of concern in the quality of research in social sciences at the universities in Kenya from a research examiner and trainer experience perspective.

Research Training in Africa: Re-Defining Post Graduate Mentoring for Quality Outcome in Higher Education

Dr. Dorothy Ndunge Kyalo*, Dr Angeline Sabina Mulwa and Dr. Adeline M. Mbithi
University of Nairobi, Kenya
*Corresponding Author, ndunge.kyalo@yahoo.com; Dorothy.ndunge@uonbi.ac.ke

Abstract

The aim of this research was to establish the perception of faculty members, PhD students and the Board of Postgraduate Studies (BPS) on the research training in higher education. The objectives of the study include: PhD registration process, students' support system, PhD supervision, thesis submission process, and institutional quality checks and how they influence quality of post graduate training in Africa.The sample consists of 200 individuals drawn from 418 PhD students who graduated in 2012-2015, 10 deans and 40 PhD faculty mentors all from the six colleges of the University of Nairobi. A questionnaire is used to collect data from the students whereas key informant interview schedule is for soliciting in-depth information from the deans, faculty mantra and BPS directors. Data analysis methods include arithmetic mean and standard deviation for descriptive data, Pearson's product moment correlation (r), simple regression, multiple regressions and stepwise regression (R^2) for inferential data while F-tests are used to test hypothesis. Significance of this study need not be over emphasized. However, the end product will be improved completion rates, retention, employability, publishable work, and contribution of knowledge for economic development in Africa

***Key Words**: Postgraduate training; quality outcome; mentoring; research; higher education; Kenya*

Promoting Academic Integrity: a Survey of Selected Postgraduate Programs at Kenyatta University

Dr. Kebeya Hilda
Kenyatta University, Nairobi, Kenya
hildakebeya@gmail.com

Abstract

Academic integrity refers to the pursuit of scholarship in an honest and fair manner which is devoid of plagiarism, cheating, falsification, fabrication and/or any form of irresponsible behavior. Members of faculty and postgraduate students in many institutions of higher learning around the globe are expected to have academic integrity. There are 'rules' on what one is *not* expected to do. Many institutions have, however, neither defined academic integrity nor expressly committed to it (The Centre for Academic Integrity, 1999). Yet, it is obvious that society stands to benefit more when institutions of higher learning uphold academic integrity in all areas of operation. Sadly, many institutions are now required to set aside more time and resources to deal with rising incidences of cheating and academic fraud. Digitalization of academic material and high student numbers has impelled many individuals to academic dishonesty. Like other institutions of higher learning around the world, Kenyatta University has seen postgraduate student numbers soaring in the last few years. More and more Kenyans are embracing higher learning in order to improve their socio-economic status. This has been made easier by many universities setting up satellite campuses in a majority of the country's towns. Consequently, a growing number of people have exploited these opportunities that are readily available. The downside is that today more postgraduate students in Kenyatta University and other institutions of higher learning are now taking advantage of the 'crowded' lecture halls by engaging in cheating and plagiarism.Studies have shown that 75% of students in American universities cheat at least once in their undergraduate studies. Statistical data on cheating trends among undergraduate and postgraduate students in Kenya is lacking. There is very little documentation in the general area of academic integrity in Kenyan institutions of higher learning. This paper, therefore, seeks to address the issue of academic integrity in Kenyatta University. It explains what academic integrity is by outlining its fundamental characteristics (namely, honesty, trust, fairness, respect and responsibility). After administering questionnaires to 100 postgraduate students in Kenyatta University, we observed that each of the five characteristics of academic integrity is perceived differently by the respondents.

Key Words: *Academic integrity; Kenyatta University; honesty; truth; fairness; respect; responsibility*.

Strategic partnership for enhanced research, innovation and uptake in Africa: The KIDSCAN Research Alliance

Prof. Vincent O. Onywera[1, 2]

[1] Kenyatta University, Department of Exercise, Recreation and Sport Science, PO Box 43844-00100 Nairobi, Kenya

[2]Healthy Active Living and Obesity Research Group- Children's Hospital of Eastern Ontario Research Institute, Ottawa, Canada

Introduction: Maintaining strategic partnerships and creating new ones is key in promoting research and academic excellence. Through partnerships and collaborations, researchers can be able to secure research funding, conduct joint research, capacity building, conferences and workshops, publish in refereed journals, influence curricular, increase their visibility and contribute to nation building. **Purpose:** The purpose of this presentation is to 1) Describe the Kenyan International Development Study- Canadian Activity Needs (KIDS-CAN) Research Alliance 3) Highlight some outcomes, outputs and impact of the KIDSCAN Research Alliance including capacity building, research-uptake and other research partnerships that have emerged as a result of the alliance. **Conclusion and Recommendation:** The KIDS-CAN Research Alliance surpassed all expectations and is a model which can be emulated and replicated elsewhere**.** There is need to maintain strategic partnerships and initiate new ones both locally and internationally for mutual benefits.

Key words*: Collaboration, research, dissemination, uptake*

Sustainable Funding Of Science Based Courses: A Prerequisite to Attainment of Technical Knowledge and Skills for Industrialized Africa

Dr. Rono Kiplangat. kipronken@gmail.com, Christopher Omusula. omusulachris@yahoo.com,
Kenyatta University
P.O BOX 43844 - 00100 Nairobi

Abstract

Industrialized Nations the world over invest heavily in science and technology in higher education. Africa has experienced an average decline of 30% in public spending per student in higher learning institutions over the last 15 years. The continent's annual public expenditure per student studying science based courses is three times lower compared to that of developed countries. For Africa to build industries, exploit her vast natural resources, develop institutions that aim at reducing poverty rates and halt the spread of HIV/AIDS, investment in scientific innovations and research is critical. Nearly $90 billion investment is required over the 2010-20 periods to increase the capacity of current institutions investments in modern science & technology infrastructure. Science based courses are relatively expensive due to materials and methodology used to execute them. Several studies have discussed government allocations, endowment gifts & donations, student fees, internally generated revenues, education trust funds and research grants as current higher education funding models. None of these models has proposed a specific funding strategy for science based courses yet most African countries have proposed to become middle income earners within certain periods. This paper argues that for these countries to realize their potential, exploit their natural resources, investment in science, research and technology is critical. The paper suggests that to improve accessibility to technical knowledge and skills, the unit cost of science and art based courses should tally. The difference in the cost of science courses should be transferred to membership of their respective regulating professional bodies (RPB). RPB should not only set standards in their respective professions but also help in subsidizing the cost of the technical courses offered by their mother institutions. Enhanced member subscription to meet this new obligation shall be threefold beneficial. First there will be more trained scientists. Secondly, the trained scientists will admitted by these RPBs and more admissions will generate new incomes which will eventually create a revolving endowment fund for prospective students wishing to study science based courses. Local

polytechnics provide medium level artisans and need to invest in modern equipment and materials. These institutions need to buy modern training gargets, machines, renovate tuition blocks and rebrand their courses. Save from national polytechnics, the paper suggests that a local service charge be institutionalized by local authorities to fund local polytechnics. The paper recommends realignment of public universities according to areas of specialization. There is need to create technology & scientific innovation institutions in addition to the existing art based universities.

Key *Words:* *Industrialized Africa, Science Courses, Sustainable Funding, Technical Knowledge & Skills.*

Sharia Compliant Student Loan-Backed Securitization for Higher Education Loans in Kenya

[1]Dr.Muganda Munir Manini and **[2]Umulkher Ali Abdillahi**

[1]Department of Economics, Finance and Accounting, Kibabii University

Email: mmanini@kibabiiuniversity.ac.ke

[2]Department of Economics, Masinde Muliro University of Science and Technology

Email: aumulkher@mmust.ac.ke

Abstract

The access to higher education has been essential not only for national development, but also for individual advancement. However, governments in many countries have been under financial constraints to adequately support their higher education institutions. Globally, Muslim students carefully consider the options available for funding their studies as under Islamic Sharia law the paying and receiving of interest is prohibited. There is divided opinion amongst Islamic scholars regarding whether the interest paid on a student loan is considered as 'Riba' as this is inflationonly interest and the government is not making a profit from this. The main purpose of this research was to develop a framework for the use of Islamic Student Loan-Backed securitization that meets shariah-compliance and can be implemented in Kenya. This framework is proposed to create its structure and issue a highly graded and marketable Sukuk that complies to global shariah principles, and hence, help the Higher Education Loan Board to help Muslim students facing financial hardship. The study theoretical framework was premised on the Capital

theory. The study primarily employed secondary data drawn from the Higher Education Loan Board annual reports and Islamic Finance Council. The study recommends that the Kenyan government should explore the possibility of an Alternative Finance system available alongside traditional student loans that is not interest based, but results in identical repayments to the conventional system. This funding would be Sharia compliant and overseen by a Sharia advisory committee.

***Key Words**: Student loan-backed securitization; Sharia compliance financing; HELB; capital theory; Kenya*

Effectiveness of Performance Contracting Processes in Promoting Higher Education in Universities in Kenya

Dr. Priscilla Wanjiku Ndegwa
School Of Business
Kenyatta University - Nairobi, Kenya

Abstract

A performance contract is a freely negotiated performance agreement between the Government, acting as the owner of a Government Agency, and the management of the Agency. . The Kenyan government introduced PCs in 2003 and since then Performance contracting has become a common phenomenon in the public service in Kenya universities inclusive. The use of performance contracts has been acclaimed as an effective and promising means of improving the performance of public enterprises of which universities are part of. It is therefore a management tool for ensuring accountability for results by university staff, since it measures the extent to which they achieve targeted results. However improvement in individual or group performance cannot occur unless there is some way of getting performance feedback to the employee or work group. Performance contracting is also supposed to enhance job satisfaction for the staff with the hope that their satisfaction would lead to improved job performance which in turn would lead to tangible and improved university education. The ultimate result would be to Build *and Sustain Globally Competitive Higher Education Institutions.* With the implementation of performance

contracting in the universities there is need therefore to establish how the implementation has impacted on improvement of education delivery. This study will focus on effectiveness of performance contracting processes in promoting higher education in universities in Kenya. The study will be conducted through descriptive survey research design. The survey will target selected public universities in Kenya with the respondents being the members of teaching staff. Stratified random sampling will be used to sample the respondents from each university. The researcher will use both primary and secondary data in order to collect views, opinions, perceptions, feelings and attitudes from the respondent on issues regarding effectiveness of performance contracting in promoting education at the universities. The findings of the study will be instrumental not only to the government but also to the university management.

***Keywords**: Performance contracting and Appraisal; Higher Education; Universities*

Governance in Higher Education: Leadership Prospects and Challenges of Public Universities in Kenya

John O. Shiundu,[1]James B. Ouda[2] & Rose A. Opiyo[3] [1, 2, 3]

Masinde Muliro University of Science and Technology,

Kakamega, Kenya

Email of corresponding author: jouda@mmust.ac.ke

Abstract

Higher education is critical to economic success and sustainable development of Africa, a continent facing several challenges of growth and development on many fronts. Higher education has endeavored to provide economic and social benefits, both to the individual and the public, produces qualified human capital, adapts and generates knowledge, promotes international cooperation and improves competitiveness in the global knowledge based economy. These can be enhanced through sound governance structures at the Universities. There have been efforts to improve management of the Universities through corporate governance. These include restructuring university management, establishment of Commission of University Education (CUE), introduction of Performance Contracting (PC), and capacity building among other strategies. There have been positive developments in university governance; many have

embraced these elements of change and improvement. With the new changes, expansion and more students comes challenges and concerns. The main challenges and concerns include: (i) widening access whilst managing aspirations and the loss of value of credentials; (ii) the pedagogical challenges inherent in massification of university education; (iii) the pressure to engage in regionalizing and globalizing higher education projects as solutions to problems (internal governance issues; sustainability issues; global challenges) whilst ensuring local relevance over the national interest; (iv) too much focus on providing external oversight to universities, while not enough is being done to cultivate the capacity for evaluation and accountability from within. The role of councils in transformation has not been properly crystallized; (v) while frameworks had been created to provide oversight, research shows that the status quo is still being maintained; (vi) there was consistent conflict between management and staff unions; (vii) lack of adequate human resource as well as infrastructural limitations. This paper places these challenges, and concerns, on the table, by looking at how corruption and other vices have been a major contributing factor to most of these challenges and concerns and suggest solutions to improve the situation.

***Keywords**: Leadership, Governance, Higher Education, Challenges, Prospects*

Kenyatta University's Journey towards Empowering the University Community with Spatial Thinking and Practical Skills for Problem Solving

Simon Onywere*, Solomon Mwenda, Victor Okoth, Ben Mwangi, Alex Asige
Kenyatta University
*Correspondence: onyweres@gmail.com or Onywere.simon@ku.ac.ke

Abstract

Kenyatta University has made tremendous steps towards empowering the university community with spatial knowledge for problem solving through GIS training over the past four years. In the quest to impart practical GIS skills, the institution has taken an initiative to partner with Environmental Systems Research Institute (Esri) since 2012 when the institution signed up for

the Esri 100 African Universities programme. The objective of the programme was to accelerate GIS education in sub-Saharan Africa. Since the acquisition of the site license, over 1000 students have been trained on Geographic Information System (GIS) and remote sensing. Besides the GIS trainings, the University has participated prominently in capacity building and dissemination forums such as Esri User Conference, Esri Eastern Africa Education conferences, GIS Days, among other workshops. During the 2014 Esri Eastern Africa GIS conference, that was held in the University of Dar es Salaam, the University was recognized as a lighthouse of GIS and in July 2015, the efforts of the institution were recognized by the President of Esri, Jack Dangermond and subsequently awarded the 2015 Special Achievement in GIS (SAG) award during the annual Esri User Conference that was held in San Diego, USA. The impact of the GIS training has seen several students advance their careers in GIS and gain entrance to post graduate programs on that basis and increasing their employability potential. The University has also extended mentorship support to other institutions such as Kabianga University College, Cooperative University of Kenya, Taita Taveta University College, Kisii University and Technical University of Kenya. Kenyatta University is now a reference account with Esri, providing leadership in GIS and technology body of knowledge in the region. The implementation of the practical in-course trainings across schools and accessibility of the labs for practical applications for research has enabled the students to build on their skills and develop applications and papers presented during the conferences. The tools have also been widely used in course units that require GIS practical knowledge and application thus changing the approach in teaching and research across the university.

The Genesis of School Of Continuing Education at Kenyatta University through Self-Sponsored Programme And Its Effects On Education In Kenya

Prof. H.O. Ayot & Prof. S.O. Ondigi (Kenyatta University)

Abstract

The mission of Kenyatta University is mainly teaching, research and service to the society. However, due to reduced funding from the government to university programmes worldwide, the

fourth role namely; commercialization of some university programmes for purposes of generating additional revenue has been added. The British universities during Margaret Thatcher's regime for example were encouraged to use their resources and market their programme to attract foreign students to meet some of their needs. Professor and lecturers that developed courses, which were attracted to foreign students were promoted and retained. Those who were unable to generate funds were retired. Universities in North America on the other hand turned their attention to consultancy with industries. The industries in Europe and America went further to request universities to help them with research to improve their products. In process, the universities of the west developed the concept of entrepreneurial and adaptive university which became a significant development from the tradition model. It follows therefore, that to become entrepreneurial and adaptive, there must be a need for perceived and thought philosophical position in which community service becomes desirable and integratable part of the university mission. This philosophical position was driven by Prof. G. Eshiwani, Prof. H. O. Ayot and Prof. M.M. Patel to spearhead School for Continuing Education which allowed qualified individual to access university education and to access university education has become popular with other universities. The paper intends to examine the development of self-sponsored programmes at Kenyatta University and its effect in Education in Kenya since 1998.

Research Utilization among University Academic Staff in Kenya: A Case of Education, Arts and Social Sciences

Dr. Wambua, Benjamin Kyalo
Department of Educational Management and Policy Studies,
Moi University
Email; kyalowmb44@gmail.com

Abstract

The government of Kenya recognizes the importance of research in its higher education policy objectives. Effective research utilization strategies are considered instrumental in the realization of Vision 2030 and development in general. Participation by university staff in scholarly

publishing and research utilization is still minimal. This study assessed research utilization among the academic staff in three public and two private universities in Kenya. The study sought to examine the following: the areas of research concentration by university academic staff in Kenya, the purpose of research utilization, Institutional support towards research utilization, the perceived barriers to research utilization, and the determinants of research utilization. The study adopted cross sectional research design, and employed both qualitative and quantitative paradigms. It was anchored on Diffusion Innovation Theory. Sample size, which comprised of university academic staff members, Heads of departments, Deans of faculties and Library managers from both public and private universities, was determined using both probability and non-probability techniques. Questionnaire, interview guides and observation schedules were employed in data collection. Descriptive statistics, multiple linear regression analysis and two independent t-tests were adopted for quantitative data analysis. Qualitative data were categorized and analysed according to themes. The study established that institutional support, academic qualifications, and innovation qualities of research-based evidence determined participation in research utilization. Barriers to research utilization were created by the complexity of research reports and their lack of relevance, timeliness and accessibility. Both private and public universities demonstrated commitment to research utilization in terms of budgetary allocation and infrastructural facilitation. The findings of this study will be of interest to policy-making institutions, educators, quality management system analysts, and university management. The study recommends increased institutional support towards research activities in form of budgetary allocations, ICT facilities and training programmes on statistical analysis, integration of research-based evidence in policy formulation and pedagogy, and increased participation in applied research.

***Key Words**: Research Utilization, Determinants, Barriers, Diffusion Theory, Institutional Support*

Uncertainty in Universities in Kenya: The Role of Public Relations Function

Catherine Nafula Nandain

Technical University of Kenya

Abstract

Universities are riddled with uncertainty at unprecedented levels. Even though organizational change is inevitable, the ongoing statutory and regulatory structural changes are contributing to vagueness, ambiguity and disorientation in the internal operations and planning functions of universities, as well as among its internal publics. This situation is further reinforced by the absence of effective public relations function in the management structures and corporate leadership roles. A recent empirical study revealed unprecedented state of uncertainty of up to 90 percent caused by legal framework such as Universities Act 2012, upgrading of technical and middle level colleges into universities, sporadic student enrolments as well as proliferation of campuses without commensurate facilities. These are all external changes that have caused uncertainty in the internal operations of the universities. Based on the findings of the study, it was apparent that although public relations function plays a critical role in management of organizational uncertainty, this is not effectively mainstreamed in the operations of universities. The study adopted a triangulated design and data collection based on self-administered questionnaires, structured and in-depth interviews as well as focus group discussions. This paper seeks to recommend the mainstreaming of PR function in the university's corporate leadership structure and its strategic management.

***Keywords**: Uncertainty, Public Relations Function, Management and Corporate Leadership of Universities, Regulatory and Statutory Changes in University Education Sector, Organizational Change.*

Mainstreaming Open and Distance Learning in Higher Education in Kenya: Prospects and Challenges

Prof. Ezra Maritim and Prof. Fred Keraro,

Egerton University:

Email: ekmaritim@yahoo.com

Abstract:

Globally, distance learning has gained recognition and legitimacy as a philosophy of learning, as an academic discipline and as a mode of delivery. The establishment of the Open University, UK, in late 1960s became the panacea for the development and the proliferation of open universities in developing nations. Today many developing nations have various facets of distance learning offered at both university and non-university institutions. The Southern African Development Community stands out as regional block that recognises ODL as a vehicle for both expanding access and equity in higher education for non-conventional learners and for enhancing regional integration.

Distance learning is not a new development in Kenya. Historically, Kenya has been involved in distance learning at three levels: first as a consumer of distance learning programmes from other countries, second as a facilitator of distance learning for partner institutions and third as a provider.

In view of Kenya's low priority given to ODL at the macro-level, ODL has been left to vagrancies of market forces at micro-level. Despite this unfavorable situation, ODL continues to be a potential window of opportunity for both school and non-school leavers. The purpose and the tenet of this paper is to look at the place of the ODL in higher education in Kenya in the context of emerging high demand for university education and training, declining budgetary allocation to universities, technological advancement and policy framework. Within these contexts, the paper analyses the status of distance learning as provided in Kenyan universities by looking at how these situations pose both prospects and challenges. The case of Egerton University ODL methodologies will be used to demonstrate these prospects and challenges.

Student leadership and its contribution to PhD training in Africa; Example from the Consortium for Advanced Research Training in Africa program

Beatrice Maina[1] bmaina@aphrc.org

[1]African Population and Health Research Center

Abstract

Leadership defined as *"a process constituted of individual activities, interactions and actions which affect the systems inside and outside the organization" (Allen & Others, 1998)* is a central bond of any organization. Leadership development is considered a major and effective factor in institution of learning. Miller (1997) indicates that student leadership development empowers students to mature and develop toward greater levels of leadership complexity, integration and proficiency over a period of time. Student leadership development stems from engagement in university organizations or associations, experience of leadership position in university activities, and leading class sessions each having a differential impact on leadership—sense of responsibility, independence, acquiring academic experience, satisfaction and more positive attitude to life. Student leadership is a core element in the Consortium for Advanced Research Training in Africa (CARTA) program. This is in line with the Consortium's overarching goal of developing research leaders and change agents in African partner universities We believe that the best way to learn is by doing and student leaders in the six cohorts learn on the job how to mobilize teams, create a sense of harmony, resolve disputes and conflicts amicably and keep the cohorts focused on the goal of attaining a high quality PhD. Student leaders provide vital link between the executive directorate and fellows. They are the first line of response as well as the sieve for issues that can be resolved at their level. They also serve as voice for the fellows especially where sensitive issues arise and the need for confidentiality is obvious. CARTA has empowered student leaders and equipped them with the requisite skills to offer quality transformative leadership. The six student leaders in the CARTA program were interviewed on their roles as student leaders, benefits of being a student leader and overcoming challenges of student leadership. Leadership creates an opportunity for one to learn and grow as a person. Participation in student leadership has potential benefits with long-term effects such as greater sense responsibility, teamwork development, and decision-making, appreciation of fundamental organizational structures and processes, and communication skills. In addition to personal benefits, communities and institutions where these leaders come from also benefit because leaders exert a profound influence on the behaviors, values, and attitudes of their peers. They are also committed to developing leadership in others. Time is of essence as a student leader, and there is no opportunity to make excuses as one learns to juggle leadership duties, academic work, employment and social life. Student leadership also creates a compounding series of

opportunities. When one is a great leader, opportunities starts to present themselves one after the other creating a snowball effect of great new things in future.

Knowledge Management Practices and Sustainable Research in Kenya

David Nandasaba Musuya
Adjunct lecturer; Kibabii University
Mary M Waruguru , UNISA.

Abstract

This was a desk top study approach that used the meta-analytic design technique of research methodology. The integrates studies of interest and make conclusions.. The research picked on six studies and explored their findings. The problem in the paper is that despite generating and having significant volumes of knowledge, university research is indeed less sustainable. There are few incentives for further research and there is no tangible application of new research findings to solve socio-economic problems. The objectives of the research were i. To find out reasons working against sustainable research in and, Universities and ii. To find out sustainable knowledge management strategies. There were six studies that were explored to provide solutions to the research objectives. After a thorough analysis of the studies the following was concluded; Sustainable research has been impeded by a lack of understanding that knowledge is an asset, and should be managed within an appropriate framework; knowledge repositories should be well structured for easy access. Secondly there must be commitment form the government to value research information by making use of it and Universities should forge close links with industries. Finally it was established that all universities and industry firms should be able to have link knowledge repositories in open access system. Since research findings solve social-economic problems in the country the government should support research in terms of funding, use of the information and legally protecting the infringement of intellectual property rights.

Keywords*; Knowledge, Knowledge Management, Sustainability, Research*

A Utilitarian Approach to Analysis of Education in Kenyan Public Universities

G.A Owiti

(Department of Philosophy, History and Religious Studies,

Egerton University, July 2016)

email-ganjejoowiti@gmail.com

Abstract

This paper is basically a survey of the History of Education in Kenya with particular reference to public University Education. An examination of the reports of various commissions of education has provided a useful background to the thesis of this paper. Information from the Kenya Universities and Colleges Central Placement Service (KUCCPS) and the Commission for University Education (CUE) has been referred to for information concerning the challenges facing the education sector. The paper examines both the quality and quantity of university education in Kenya and emphasizes the utility of education as perceived in utilitarian philosophy. Through a historical survey of Education in Kenya, an attempt is made to study the apparent mismatch between the quality and quantity of university education in Kenya and the challenges that it faces. The paper interrogates the philosophy and historical development of education in Kenya, and in particular, its ethical foundations. It then proposes the application of the Utilitarian Ethical theory as a possible panacea to the challenges facing education in Kenya with special reference to the Public Universities. The theory classifies good actions as those which are likely to produce the greatest pleasure for the greatest number of people concerned. The paper argues that education in Kenya is able to meet the requirements of the ultimate good and that the prevailing socio-political and economic challenges hinder the achievement of this.

Qualitative Research in Special Education: Most Common Errors Made by Graduate Students and Beginning Researchers in preparation, data collection and data analyses Phases of Research.

Dr George Mathenge Wairungu

Department of special Education, Kenyatta University

Abstract

Whether a researcher opts for quantitative or qualitative research design depends with his/her research question. There are many questions that are better explained quantitatively while others qualitatively. While this is the case, there are many common errors that could make the findings of qualitative research unreliable. The errors may be made in the preparation stage, methodology, in the field or even during analyzing of data. In special education, a researcher deals with a protected section of the society. Special authorization is required from various authorities in the government. It is possible for a researcher to ignorantly head to the field before this is done. This could lead to discontinuation of the research prematurely. People with disabilities as well as their families may also be oversensitive to some questions asked during the research interview. This may l affect the answers they give to some questions. Many respondents become emotional or as well respond in manners that affect the researcher emotionally. This could lead to low quality of data collection by the researcher. Other challenges include poor framing of questions, malfunctioning of data recording gadgets and poor control of focus group interview. Nodding and other gestures during research interview may also derail the interviewee's train of thought and affect the nature of information elicited from them. When analyzing data, a researcher may also forget the objectives of the research due to interesting matters arising in conversation with interviewees. This paper discusses the most common research mistakes made by students and beginning qualitative researchers in Special Education. Fifty qualitative research papers from peer reviewed journals were reviewed while writing this paper.

Identification of Competencies for Professional Training: A Case Study on Physiotherapy Course at the Kenya Medical Training College, Nairobi

Gladys J. Mengich

School of Public Health , Biomedical Sciences and Technology, Dept of Health Professions Education, Masinde Muliro University of Science & Technology, Kakamega, Kenya

E-mail: gladysjp@yahoo.co.nz

Abstract

Physiotherapists trained in Kenya evolved from masseurs to Kenya Registered Physiotherapists. The rapid developments of paramedical training programs led to training at diploma level in the current Kenya Medical Training College (KMTC). Physiotherapists should cope with current

health challenges by acquiring clinical competencies in order to prevent, manage and provide adequate therapeutic and rehabilitative services for the whole population. The study consists in a descriptive educational research for physiotherapists in the Ministry of Health, Kenya Medical Training College, and public and private hospitals in Kenya.The objective of this study was to identify competencies for training Physiotherapists at the KMTC to be competent in hospital and community set-up. Specific objectives were (1) to identify areas of competencies for training professionals and (2) to establish a curriculum training future practice.The methodology consists in random sampling 30 respondents consisting of: physiotherapy graduates, KMTC lecturers, public and private practitioners, and administrators from the Ministry of Health.The competencies identified by the participants from first round were clustered and the second round of questionnaires was derived therefrom. From the second round of questionnaires, a consensus of a list of clinical competencies for training was derived. The response rate was 100%. A consensus was achieved when participants repeatedly identified all the areas of clinical competence to be added into the curriculum. The participants rated 'Very Useful' on the following areas: research (86.6%), standards in physiotherapy (86.6%), community-based rehabilitation (83.3%), counseling of patients and relatives (80%), emergency and disaster management (80%), communication (80%), medical legal issues and professional ethics (70%).In conclusion, there is a need to train physiotherapists to be competent in both community and hospital set-ups and it is recommended that KMTC should identify areas of competences for training health professionals using a modified Delphi technique. Courses developed should cope up with current health practices and prepare health professionals to work in both community and hospital set-ups.

Keywords*: Physiotherapists; competences; modified Delphi technique; health professions; curriculum; Kenya.*

Staffing Needs in Higher Education: The Fluidity of Gender and Ratio Dynamics in the University Sector

Jackson Too[1] Ph.D., **jtoo@cue.or.ke**, Alice Kande[2] **akande@cue.or.ke**, Silas Oure[3]
soure@cue.or.ke
1-Corresponding Author, 2 and 3 Commission for University Education (CUE)

Abstract

Data from universities has revealed that there are glaring disparities in terms of the university type (public or private); qualification and gender. Public universities possess the highest number of the staff at 74%; while private universities have a smaller proportion of 26%. This seems to suggest that public universities attract more staff because of the wide diversity of programmes which they have developed and offer. However, that does not suggest that there is adequate staff in the universities. In fact there exists a dire shortage of staff. Is this state attributable to the unattractiveness of academic positions? The high student-staff ratios currently obtaining in universities present a daunting challenge to the teaching faculty as a whole, but particularly so for those in the early stages of their career. Data obtained from the study showed that the overall staff student ratio at 1:34; with the highest cluster of staff to student ratio in education (science) at 1:200. Followed by Education (Arts) with 1:54, and Service Courses with 1:48 - which is above the UNESCO accepted level of 1 to 30 (UNESCO, 2008). The proportion of staff with PhD (5,604) to the total enrolment of students (539,749) was 1 to 98.

The workload that accompanies responsibility for large student numbers imposes significant career-stalling burdens on young scholars. The anxiety that comes with such a burden, in a context that demands high standards of research productivity, can discourage potential academics. Institutions' sensitivity and responsiveness to young employees' work-life circumstances is particularly helpful in attracting and retaining female academics whose careers tend to be significantly compromised by the contending demands of home and work.

The dynamics playing around staff ratio, programme cluster are discussed in this paper.

Key words: *academics, staff ratio, gender, career, cluster, disparity,*

Adequacy of post graduate research methodology training: a case of the School of Education, Kenyatta University

Hellen Kiende and Mukirae Njihia

Abstract

Sub-Saharan Africa which trails other regions with regard to key Human Development Indicators produces less than 1 percent of the global research output despite having 12.5 percent of the global population (World Bank, 2014).If the region is to improve on its Human Development Indicators, it must embrace research in addressing the many developmental challenges facing it. Therefore, the need for quality training in research methodology in sub-Saharan Africa especially for its postgraduate students is critical for the region to raise its research output. Quality training in research methodology would help impart skills and competencies in the upcoming scholars to enable them address the various problems facing the community. There is a need then to constantly evaluate the relevance and adequacy of the research methodology training given in the universities in the region. This study, therefore, captures the perceptions of post graduate students in the School of Education, Kenyatta University on the relevance, quality, effectiveness and adequacy of the research methodology training. The study will employ the cross sectional descriptive survey design. The target population will be all the post-graduate students in the school of education. Data will be collected using questionnaires and interview schedules. This study is significant in that it may help the School of Education seal the training gaps in its research methodology curriculum. This will lead to enhanced teaching of research methodology which may in turn lead to higher research output and an improvement in the Human Development Indicators.

***Key words**: Research, research methodology, research output, Human Development Indicators, quality, effectiveness, adequacy*

Postgraduate Quality Education and Research at Masinde Muliro University of Science and Technology, Kenya

Henry N. Kemoni
School of Graduate Studies,
Masinde Muliro University of Science and Technology, Kenya
hkemoni@mmust.ac.ke or deansgs@mmust.ac.ke

Abstract

Postgraduate research is a core aspect of graduate training in line with MMMUST Strategic Plan 2015/16-2019/20. The Commission for Higher Education [CUE], Kenya has provided benchmarks for quality education and research training at postgraduate level In Kenya and is commonly used to benchmark quality postgraduate research in Kenyan Universities. The paper is based on desktop research and triangulated by data sourced from selected postgraduate students and graduate Faculty at Masinde Muliro University of Science and Technology [MMUST]. It presents empirical data on graduate research training and implications on research concept development and proposal writing, thesis supervision and examination as well dissemination of research for the benefit of policy, research, practitioner and scholarly communities. The paper further addresses issues of nature of post graduate research training and implication for quality and student's completion and retention rates. Challenges faced in providing quality postgraduate training and opportunities derived from such challenges presented. Initiatives by MMUST to improve graduate education and research and the role of MMUST School of Graduate Studies in repositioning graduate school to be a much sought place for graduate education nationally and internationally highlighted. Suggestions for further research provided. It is hoped that the paper contributes to the discourse on quality graduate education and research using insights provided by a local public university.

ICT integration in higher education: a comparison of policies and practices in Kenyan universities

Dr. I. Mwangi-Lecturer,
Kenyatta University
E-mail: minaeisaac@gmail.com

Abstract

ICT is a major driver of transformation in all sectors of the economy including higher education. Universities in Kenya invest significant resources towards ICT with the aim of exploiting the potential their potential in a highly competitive knowledge economy. This paper focuses on information and communication technologies (ICTs) policy initiatives and practices in in higher education in Kenya. The paper analyses the existing policies in public and private universities in Kenya with the aim of: establishing the nature of these policies; the leadership dynamics in the

context of ICT policy enactment and practice; the nexus of e-learning and mobile learning in higher education; and the strategies instituted by universities in the implementation of ICT policies. Beyond these objectives, the paper examines the roles of different stakeholders regarding the integration of ICT in higher education. The synthesis of institutional frameworks in the context of this study creates an ICT policy formulation and implementation theory for stimulating innovations higher education institutions.

Key words: *ICT policies, Higher education, innovation, ICT integration*

Trends and Status of Social Science Post-graduate Research Training in Kenya

Grace Bunyi, Martin Ogola, Mukirae Njihia & Joyce Wangia

Kenyatta University, Nairobi, Kenya.

Email address of corresponding author: bunyi.grace@ku.ac.ke

Abstract

Globally, higher education has experienced significant growth in the last few decades. In Kenya, university education has been on an unbridled expansion mode since 2007. Between 2007 and 2013, for example, 17 new public universities, not to mention constituent colleges of the various universities, were established and undergraduate student numbers soared to 276,349 in 2014 (Nganga, 2014). Training in research has also expanded as virtually all the universities have launched postgraduate programs. The result is an increase in the number of students graduating with research degrees at masters and doctorate levels. This could be a source of satisfaction given that national development policies such as in Kenya Vision 2030 place emphasis on the role of universities in knowledge production and training in research and innovation. However, the quality of training is paramount for research to play a significant role in national development. Drawing our quantitative and qualitative data from a larger ongoing study on the production and utilization of social science research in Kenya, we examine the status and quality of the social science research training offered in three and two selected public and private universities respectively. We ask questions about the students, the faculty, the research curriculum and delivery modalities, and the quality assurance processes in these universities and

make recommendations for improved training of social science researchers in Kenya, in particular and by extension elsewhere in the continent and beyond.

***Key words**: research training, social science research training, post-graduate research programs, research curriculum.*

Overcoming Challenges in University Education in Africa in the 21st century

Prof. James Biu Kung'u

Department of Environmental Sciences, Kenyatta University, P.O. Box 43844 00100 Nairobi, Kenya. kungu.james@ku.ac.ke

Abstract.

University education plays a critical role in a country's development, particularly in the global context where knowledge-based innovations and products are fetching high value on the market. In addition to economic benefits, university education offers scope for, environmental, cultural and community development. Over the last few decades, many countries in Africa have witnessed tremendous growth in the number of students registered in their universities. This is to a large extent a realization by African stakeholders, including political leaders of the value of university education in achieving their visions for development. Many international agencies like the World Bank, once skeptical about the value of university education in Africa's environmental, social and economic development are currently among the major advocates of the need for revitalization of higher education in Africa. The high number of students in some Africa universities has led to many challenges including complaints from employers of half-baked students who are not in touch with reality. There is very little money spend on research in Africa universities with the continent as a whole spending less than 0.5% of its GDP on research. This level of funding poses a major challenge to the continent's development. The lack of enough resources for research hinders universities from generating and creating relevant knowledge leading lecturers not using conceptualized training materials and very low publication level. Africa has remained with the lowest ratio of researchers per million inhabitants and an average of only 35 scientists and engineers per one million inhabitants. This paper identifies the various challenges Universities in Africa are currently facing and offers solution on how

government and universities in Africa can overcome these challenges in the 21st century.

Keywords: *University education, Funding universities, University research, Role of researchers, conceptualized training materials, ICT in universities, University management*

Assessment of Lecturers Perceptions on Students-Lecturers Evaluations in Higher Education Institution in Kenya

BY: Julius K. Maiyo

Email:maiyojulius@yahoo.com or maiyojulius@kibabiiuniversity.ac.ke

Kibabii University

Abstract

The common approach method of evaluating instruction in higher education classes is to have students provide feedback on "effectiveness" of learning in a given period. Evaluations generally request specific feedback on measures of teaching effectiveness and on particular aspects of a course, as well as global rating questions. Countless myths and misperceptions regarding course evaluations exist and inevitably influence faculty, university administrator and student perceptions. In spite of solid research to counter these assumptions, such beliefs persist and continue to spread. The study was envisage to focus on assessing lectures perceptions on students lecturer evaluations in higher Education. The study was conducted in Kibabii University and targeted all the teaching staff of the University. The objective of the study was to determine the influence of professional status, age, gender and years of experience on lecturer's perception of student's competency in evaluating lecturers teaching effectiveness. To examine lecturers perceptions on the formative and summative purpose of students in the evaluations. The study adopted a descriptive research design. The data was collected using a questionnaire that was validated and reliability of 0.917 was attained. Data was analyzed using both descriptive and inferential statistics. The findings were presented using tables, graphs and pie charts. The results indicated that there was no significant difference between male and female lecturer's about their perception on student's evaluation. The study revealed that feedback on student's evaluation helps lecturers to improve their teaching and interaction. The respondents disagreed that reports from the student evaluation be used for promotion and increment of their salary. The study

concludes that inadequate instructional materials among the key factors that affect the quality of teaching and learning. The study recommended that the university should provide adequate instructional materials and enhance conducive environment for learning.

***Keywords**: Assessment, Quality, Evaluation*

Translating Academic Research into Innovation; Implementation of Academic Studies in To Policy and Practice in Kenya

Kaumbulu Fredrick Kyalo, PhD student
Kisii University,
fredkaumbulu@gmail.com

Esther Njeri Njoroge, MA student,
Egerton University
haddassahnjeri26@gmail.com

,

Abstract

This paper focuses on the translation of academic research into innovation in Kenya. In this conceptual paper, the authors used systematic review process spanning from three varied projects to investigate key factors influencing the diffusion and adoption of evidence-based innovations in energy sector, mental health and the threat boy of child in Kenya. This paper found that the success and speed of the adoption process depends on the roles of various stakeholders, leadership; the generation of credible supportive data; an infrastructure dedicated to translating the innovation from research into practice; the extent to which sociological changes are required; and the amount of coordination needed across departments or disciplines. The productive generation and exchange of ideas and skills can result into increased translation of science and research into innovations, which benefit the economy. However, identifying and maximizing the mix of institutions and organizations that allow for this is not always straightforward. Translation of research should not strictly focus on science and physical technologies but also the mix of

individuals, organizations, and institutions the 'social' technologies that most effectively exploit science, technology, and innovation to benefit society. The objectives were: to investigate the cultural factors affecting the translation of academic research into practice in Kenya, to explore economic challenges of translating academic research into practice in Kenya, and to investigate the involvement of stakeholders in translating academic research into practice in Kenya. The authors used secondary methods of data collection. In the three cases, studies selected for their diversity in design. The innovations in each study based on different populations. The study found out that there was the lack of stakeholder involvement hence there was no awareness. There are serious economic constraints in implementing the research into practical situations. The study concludes that there is need for all stakeholder to put in place mechanisms so the once research is done, its practical implementation in effected immediately.

Assessment of Research Utilization among University Academic Staff in Kenya: A Case of Education, Arts and Social Sciences

Dr. Kyalo Benjamin Wambua:
Department of Educational Management and Policy Studies,
Moi University
kyalowmb44@gmail.com:
+254722268632

Abstract

The government of Kenya recognizes the importance of research in its higher education policy objectives. Effective research utilization strategies are considered instrumental in the realization of Vision 2030 and development in general. Participation by university staff in scholarly publishing and research utilization is still minimal. This study assessed research utilization among the academic staff in three public and two private universities in Kenya. The study sought to examine the following: the areas of research concentration by university academic staff in Kenya, the purpose of research utilization, Institutional support towards research utilization, the perceived barriers to research utilization, and the determinants of research utilization. The study

adopted cross sectional research design, and employed both qualitative and quantitative paradigms. It was anchored on Diffusion Innovation Theory. Sample size, which comprised of university academic staff members, Heads of departments, Deans of faculties and Library managers from both public and private universities, was determined using both probability and non-probability techniques. Questionnaire, interview guides and observation schedules were employed in data collection. Descriptive statistics, multiple linear regression analysis and two independent t-tests were adopted for quantitative data analysis. Qualitative data were categorized and analysed according to themes. The study established that institutional support, academic qualifications, and innovation qualities of research-based evidence determined participation in research utilization. Barriers to research utilization were created by the complexity of research reports and their lack of relevance, timeliness and accessibility. Both private and public universities demonstrated commitment to research utilization in terms of budgetary allocation and infrastructural facilitation. The study recommends increased institutional support towards research activities in form of budgetary allocations, ICT facilities and training programmes on statistical analysis, integration of research-based evidence in policy formulation and pedagogy, and increased participation in applied research.

The Gap between policy making and Implementation in Higher Education Sector in Kenya

Lynette G. Kisaka[1], Jackson K.Too[2] and Eusebius J. Mukhwana[3]

Commission for University Education (CUE)

Corresponding Author lkisaka@cue.or.ke;

Abstract

The policy process is a crucial element in educational planning and planners need to appreciate the dynamics of policy and policy formulation before they can design educational implementation and evaluation procedures effectively. Haddad (1995) observes that educational planning entails the processes through which issues are analysed and policies are generated, implemented, assessed and redesigned. In its broadest generic sense, educational planning is the application of rational, systematic analysis to the process of educational development with

the aim of making education more effective and efficient in responding to the needs and goals of students and society (Coombs, 1970).

Education is full of policy challenges and policy-makers play the key role of identifying them and presenting them in a way that motivates action by practitioners. Difficulties in practice arise when the recommended policy is not based on sufficient knowledge or analysis of the education system and its social, economic & cultural environment; when goals are unclear and not based on priorities; when technocrat's elaboration of the programme is not understood or accepted by stakeholders or decision-makers; when there is no implementation strategy that specifies means and guidelines to achieving each goal; and when feasibility of the programme is not explained. In some cases the division of responsibility for developing guidelines may not be clear, and some level of uncertainty often exists concerning the degree to which lower level administrative units such as counties are bound by decisions or guidelines established at the national level or headquarters. The paper will discuss the interplay of these dynamics and propose ways in which the gap between policy making and implementation can be bridged.

Key words: Dynamics, Implementation, Planning, Policy, Strategy.

Strategies for strengthening research competitiveness in African Higher Education Institutions

Maina Mwangi, Directorate of Research Support, Kenyatta University
Maina.mwangi@ku.ac.ke

The research mandate in higher education institutions (HEIs), when effectively executed, contributes to institutional growth in many dimensions. Research products can generate significant income from business spinoffs; results can enrich the teaching/ learning experience; and outputs underpin relevance and visibility of HEIs to society. This notwithstanding most African HEIs lack well-articulated research agenda and their capacity remains generally weak. In many HEIs over-reliance on external funding has stymied creativity and fostered a culture that of reacting to opportunities. This paper reviews some strategies that HEIs can use to strengthen their research capacity and competitiveness. An effective "in-out" strategy should facilitate researchers to proactively move outward to engage external communities in identifying research needs and issues to inform and enhance precision in defining and prioritizing research focus in

HEIs. Proactive outward engagement focusing particularly on industry to resolve their challenges can be a highly beneficial and effective strategy in mobilizing resources for research. A converse "out-in" strategy should enable HEIs to open themselves up and attract attention of key stakeholders seeking to engage their research capacity, hence spur demand for research services and products. HEIs can enhance their competitiveness by developing capacity and readiness to venture into unforeseen "black swan" thematic areas that are likely to present opportunities for innovation and less crowded access to resources.

An Audit of ICT Funding on Effective Integration of ICT's In Selected TVET Institution in Kiambu and Murang'a County, Kenya

Author Name: Mr. Tirus Muya Maina
Affiliation: Murang'a University College, Kenya
Email: tirus.maina@gmail.com or tmuya@mruc.ac.ke

Abstract

Developing countries like Kenya has begun to realize the significant role TVET has to play in the development of a competitive workforce and an equally discouraging realization has arose that governments can no longer be expected to fund TVET to the heights required to meet the needs of the modern world thus Underfunding is an operational problem in the TVET sector. The study was an audit of ICT Funding on Effective Integration of ICTs in TVET institution in Kenya with specific reference to Michuki and Thika Technical Training Institute in Murang'a and Kiambu County respectively. The research adopted quantitative research approach and use probability sampling which is commonly associated with Survey-based research. The study's main data collection tool was a structured questionnaire. Descriptive statistics was used and simple regression equations were developed to test the strength of association between ICT Funding and integration of ICTs in Kenya TVET sector. The study revealed that Effective Integration is positively correlated with ICT Funding but their relationship is relatively low. The government is the main source of funding ICT projects and is not adequate to finance the ICT projects in the institution since the budget allocated is still relatively low compared to needs and priorities required to effectively implement the ICT integration. The government should and has

the primary obligation for TVET institution and should be committed to apportion substantial financial resources to the TVET sector as well as marshalling resources from its partners. The TVET institutions should address the funding challenges they face through generation of other financial resources.

***Keywords**: ICT Funding, TVET, Budget, Integration, Kenya*

Translating Academic Research into Innovation: Assessing the Relationship Between Development and Innovation Policy and University-based Innovation for Knowledge-based Development in Kenya

Onesmus Muroki T. (Ph.D),
Department of Educational Management, Policy and Curriculum Studies, Kenyatta University,
P.O. BOX 43844-00100,
Nairobi Kenya
Correspondence: thuo.onesmus@ku.ac.ke

Abstract

This paper evaluates the empirical basis for optimism among policymakers in about the role of universities in the creation of a knowledge-based economy. The paper examines preliminary findings on the impact of entrepreneurial universities that have some experience in the commercialization of research and development (R&D) and innovations in concert with the industry on economic growth, structural transformation and poverty alleviation. The research objective is to examine the policy instruments, both fiscal and non-fiscal used to stimulate R&D, innovation and their commercialization, with specific focus on those targeting universities in Kenya and their relationship with entrepreneurial activities of selected universities. The researcher adopted a mixed methods design involving document analysis of policy documents and a survey of selected universities in Kenya. The outputs from university-based R&D and innovation activities within the 2011-2015 period are analyzed within the context of the existing

policy environment to evaluate the efficacy or otherwise of these interventions. This paper then examines the relationship between development and innovation policy on the one hand and the innovation activities in selected universities in Kenya. The basic conclusion of the paper is that there is a disconnect between the policy instruments and the knowledge-based initiatives. The paper also draws lessons on the measurement of innovation to guide reforms in development and innovation policy to provide clear direction for these university-based initiatives.

Keywords: *Development and innovation policy; Science and Technology Parks (STPs); university-based innovation activities*

Building and Sustaining Globally Competitive Higher Education Institutions: Transforming University Education through Inclusive Classrooms

Harriet Wambui Njui
Riara University, Nairobi, Kenya
hnjui@riarauniversity.ac.ke

Abstract

This paper reviews the literature on inclusive learning with a view to making recommendations on the strategies that teachers and stakeholders in education should employ to ensure that their learning institutions are aligned to globally accepted education standards. The paper will specifically focus on teaching strategies that enhance inclusiveness in classroom learning with specific focus on university education. Inclusive classrooms are critical if learning institutions are to adequately nurture learners with skills and competences needed in the 21st century industry such as creative and critical thinking, innovation, problem solving, communication, collaboration with others, information literacy, media literacy, creative and Information Communication and Technology literacy. It is hoped that this review will shed light to education practitioners on the critical factors that contribute to individual learner's enjoyment of their right to quality education as they go through the teaching-learning process. The paper recommends that an empirical research be carried out in universities in Kenya to determine whether they embrace the principles of inclusive learning in classroom discourse.

Key Words: *Inclusive learning; teaching strategies; skills; competencies; Kenya.*

Researching African Indigenous Science for Society Transformation: Limitations and Possibilities

Francis Akena Adyanga, PhD
University of South Africa (UNISA)

Abstract

This presentation is based on extension of past research conducted in two Ugandan Universities in 2011 and an ongoing research project in Mpumalanga Province, South Africa. The aim of the study is to find strategies for inclusion of indigenous knowledge broadly and African indigenous science specifically into the education system. The study is informed by the realization that indigenous knowledge is often conspicuously left out from interventions to address challenges in indigenous societies (Vandana, 1997; Akena, 2012). Most interventions that fail to address African challenges tend to be foreign-engineered and hence not suitable to local contexts. Reflecting on past and ongoing project, the discussion, will offer suggestions to bridge this gap. Though excluded from formal education in most African countries, indigenous knowledge is considered by my study participants as foundational knowledge that progressively sustained African societies prior to colonial contacts. According to respondents, such knowledge needs to be integrated in formal education and development agenda of African societies to contribute to society transformation in the twenty first century. Theoretically, the study is anchored on anticolonial and indigenous knowledge discursive framework. It uses qualitative research methodology to understand the lived experiences and cultural aspirations of participants and its relationship to the contemporary formal science education system. The main point in the presentation is that African indigenous knowledge is not bound in time and space but represents a complex regime of knowledge constantly evolving with changes in society. Therefore, the politics surrounding knowledge production, validation and dissemination in society needs to be critically debunked for any serious debate about society transformation to materialize.

Keywords*: African indigenous science/knowledge; society transformation; knowledge integration; knowledge production; validation and dissemination.*

Driving Collaboration for Innovation in Nigeria Manufacturing Industry

Abubakar, K.[1], Jude, J.[1], Yusuff, A. S[1], Emmanuel, O. G. [1]

National Centre for Technology Management (NACETEM), Federal Ministry of Science and Technology, Abuja, Federal Capital Territory, Nigeria

kz4tawa@gmail.com

Abstract

Innovation has been identified to stimulate new technologies, which explains why during the 1980s a growing number of companies had to trade their traditional internal innovation practices for new forms of modern co-operative practices such as joint ventures, joint development agreements and various types of technology-sharing agreements. The essence of collaboration is to leverage the advantage of others in the provision of goods and/or services for sustainable development. Firms may pull support in the areas of information sources and its management for innovation output. Over the years, the manufacturing industry used to be a huge employer of labour. As an example, the textile industry has witnessed a decline in the rate of employment from about 200,000 in 1985 to about 24,000 in 2008, indicating an 88% reduction. This decline has been recurrent and if not checkmated, the industry may gradually be eroded completely.

This paper seeks to provide responses to queries such as: How do firms source information required to facilitate innovation projects? What are the enabling environments required for international collaborations to deliver innovation? What impacts have collaborations made on the manufacturing sector of Nigeria? How can international collaborations facilitate innovations in the Nigerian manufacturing sector? What do Kenya innovative firms do different from that of Nigeria?

Data will be collected from 50 innovation projects underway in 30 different manufacturing firms spread across the six (6) geo-political zones of Nigeria. To increase diversity, a wide variety of innovations will be included in the sample, including product, process, market and major systems

innovations. The data gathered will be analyzed using the SPSS version 21.0 and Microsoft Excel for descriptive presentation of data.

The result of this study will reveal sources of information required to facilitate firm-based innovation projects. Healthy enabling environments for international collaborations to deliver innovation at firm levels in Nigeria will be explored as this will expose notable impacts made by international collaborations on the manufacturing sector of the Nigerian economy. The result will further demonstrate the impact of international collaborations on innovation projects in the manufacturing sector of Nigeria using firm level cases.

We will suggest expected sources of useful information, enabling environments for international collaborations, impacts of collaborations on the manufacturing sector of Nigeria and key requirements to drive collaborations for firm-based innovations in consonance with the Science Technology and Innovation policy of Nigeria. This will provide an evidence-based platform for the revitalization of the comatose Nigerian manufacturing industries as they will innovate better in the end.

Key Words: *Collaboration, Innovation, Manufacturing, Industry*

Exploring the Nexus between the Advancement of Science in Africa and the U.N. Sustainable Development Goals

Sam Lanfranco

Prof. Emeritus & Senior Scholar, York University

Abstract

At its core, science is a system of inquiry based on theoretical constructs, testing, and evidence-based conclusions subjected to peer review. Science as a body of knowledge underpins evidence-based policy and policy implementation in all aspects of human endeavor, ranging from individual, organizational, community and governance behavior. There are challenges between scientific knowledge and cultural, religious, and ethnic practices and ways of knowing. Nowhere

is this challenge greater than in our efforts to pursue the U.N's Sustainable Development Goals (SDGs). This presentation analyzes the scientific needs within the SDGs and identifies areas of scientific strength to build with, and areas of scientific weakness demanding attention, especially within an African context. The analysis will focus on scientific needs, and comment only in passing on the challenges between scientific knowledge and other ways of knowing.The overall goal of the analysis is to make a small contribution to the setting of priorities in the advancement of science in the service of the United Nations Sustainable Development Goals.

***Key words and phrases**: Advancement of Science in Africa; U.N. Sustainable Development Goals.*

Participatory Development Approach – Completing Participation Circle to Reduce Adverse Effects of Development in Kenya

Dulo Nyaoro
Peace Institute, Moi University
Email dnyaoro@yahoo.com

Abstract

As an antidote to the adverse effects of Development Induced Displacement and Resettlement (DIDR) projects on communities and the concomitant resistance, the concept of people's participation was borrowed from rural development and introduced in DIDR discourse and practice in the early 1980s. Participation in DIDR, while presented to developing countries as desirable, people demand has however not been universally adopted. Despite these reforms, problems continue and resistance persists. That this resistance is framed around issues of changes in ownership and use of land, sharing of benefits accruing from natural resources should be indicative of a much bigger discontent than merely getting consent. Demands for fair compensations, the appropriate location and sites of such projects and also the modes and styles of resettlement are normally taken as indication of community having given consent. Participation by potential victims of displacement and affected people seems unable to resolve these problems yet, for development to be sustainable, involvement of communities is inevitable.

The limitations of participation in ameliorating adverse effects of DIDR can be attributed to several factors. This essay argues that participation has not been successful in reducing the adverse effects for several reasons. First, compared to participatory development in rural development, participation in DIDR projects is never complete. The tail end of ownership and empowerment is omitted from DIDR projects. Second, participation in DIDR is meant to solve problems faced by project implementers and managers rather than the victims. This is why community consent is the critical part of this form of participation. Three, participation in DIDR does not address the fundamental problems of displacements which are ownership, use and benefits. Four, the time constraint and the cost of participation prevent the type of participation that would smoothly midwife the socio-economic transformations that are occasioned by DIDR. This affects both the uptake of new innovations and sustainability of development projects

***Key words**: Participation; development; displacement community.*

Promoting science and technology education for all: a challenge for African countries

Ongera Gilbert

Department of Physical Sciences, University of Kabianga, P.O Box 2030- 20200, Kericho, Kenya

Email: **gongera@kabianga.ac.ke**

Abstract

Science and technology (S&T) is universally recognized as a driver, along with education and investment of national economic development and key contributors to poverty reduction, disease prevention and environmental conservation. Although countries in Africa have given their utmost efforts in continuously improving their science and technology education programmes, the reforms are rather slow especially in terms of curriculum structure and content, as well as the professional development of teachers. In some of the countries formal educational institutions succeed in coping with the advances in knowledge but the learning in school alone rapidly becomes obsolete. In other countries, the frequent changes of government and political instability have affected the effective implementation of educational reforms. There are also discrepancies

with regard to the intended, implemented and attained curriculum. There is a general concern that little is included in the curriculum of basic school education that will allow the learners to acquire the knowledge, skills and values to prepare them for life. The positive note is that the emerging trend is towards curriculum innovation and reforms introducing learner-centred content and strategies and systemic changes responding to national development needs, goals and entry into globalization. However, there is a large gap that needs to be filled, hence the need for capacity building to have a 'cadre' of experts who can provide intellectual guidance and advisory support. There is also a need to change society's demand for education that only prepares students to pass examinations for entry into higher education, rather than learn what is relevant and to their lives and in answer to the needs of the community.

Keywords: *Science and technology, Challenges, Africa, Education*

Redesigning Tertiary Institution Academic Curriculum in Science, Technology, Engineering and Mathematics (STEM) Subjects for an Improved Science, Technology and Innovation (STI) Practice in Nigeria

Yusuff, A. S[1], Jude, J.[1], Abubakar, K.[1], Emmanuel, O. G.[1],

[1]National Centre for Technology Management (NACETEM),

Science Policy and Innovation Studies (SPIS)

North Central Office, No 3, Dunukofia Street, Area 11, Garki, Abuja Nigeria.

yusuffshola@outlook.com

Abstract

Over the years, Nigeria has fallen behind both in the continental and global market as other nations have gained competitive advantage by asserting their scientific and technological leadership. The secret of this success is ascribed to a well formulated and implemented Science, Technology and Innovation (STI) policy specifically designed towards meeting the need of such nations. In order to realise the benefits that STI contains, efforts have been made to review past S&T policies in Nigeria which not until recently (2011), have successfully formulated and launched one. Suffice it to say that the bane of scientific and technological leadership in Nigeria can be ascribed to the failure of overcoming the barriers to implementing STI policy. Another

challenge is the needed human capital with skilled knowledge capable of meeting the realities of the dynamics of S&T in this contemporary age. In this regard, it can be identified that the curriculum of our tertiary institutions are outdated and not in conformity with the present day needs as it is obtainable in other developed and emerging nations which have successfully repositioned their curriculum to focus on Science, Technology, Engineering and Mathematics (STEM). STEM is a curriculum based on the idea of educating students in four specific disciplines-Science, Technology, Engineering and Mathematics-in an interdisciplinary and applied approach. Rather than teach the four disciplines as separate and discrete subjects, STEM integrates them into a cohesive learning paradigm based on real-world applications. STEM fields affect virtually every component of our everyday lives. Introduction of STEM into the education system will elevate Nigeria's position in the global economy and give graduate students the requisite skills needed to succeed in this dynamic environment. This study is aimed at reviewing the academic curriculum of tertiary institutions in Nigeria with a view to identifying how to restructure it such that it promotes the concept of STEM as obtainable in other countries that have successfully reaped the benefit of STI policy in this respect. The study will embrace both primary and secondary sources of data. On the one hand, some Nigerian Universities will be selected cutting across privately and Public owned institutions and compare their current academic curriculum in their Science and Engineering Faculties. On the other hand, a few institutions in South Africa, Malaysia, Canada, and UK will be considered to assess how they have structured Science and Engineering curriculum in their tertiary institutions. Currently, there is a dearth of publications on academic curriculum review in STEM which focus on tertiary institutions. Past works on curriculum have focused on either basic education (Secondary School) or Women in STEM (gender oriented). Therefore, this study will critically study the issues and propose a way forward to this challenge.

Keywords: *Tertiary Institution, Curriculum, STEM, STI, Nigeria*

Enhancing Innovation through Postgraduate Research Supervision: Challenges and Prospects

Elizabeth Were

Kenya Methodist University

Abstract

Innovation among learners has been greatly emphasized within institutions of higher learning in Africa, with universities viewed as citadels of knowledge. In most African Universities, research is a compulsory unit at postgraduate level which aims at enhancing critical thinking and innovation. However, there is great concern that the rate of innovativeness among postgraduate students is on the decline. This has been associated with incompetency in postgraduate research supervision. It has further been alleged that poor research supervision has hindered Africa's advancement in science and technology as learner's creativity is fizzled. The aim of this paper is to analyze the extent to which research supervision at postgraduate level has influenced learner innovativeness, with a focus on supervisory support, competency, integrity and tolerance. The study focused on postgraduate students who had willingly volunteered to participate. A structured questionnaire was administered. A total of 47 questionnaires were analyzed. From the findings, the majority of respondents felt that their supervisors were competent, however, most of the supervisors hardly considered divergent views from students and were hardly available for consultations. It was noted that most supervisors were not keen on originality and thus plagiarism was rampant. Intolerance and intimidation from supervisors hindered suggestions of new ideas from students. Based on the findings it is recommended that universities should minimize the workload allocated to supervisors to enable them to have ample time with students. Plagiarism detection programmes should be installed in universities. There should be close monitoring of research supervision and continued training of supervisors. Universities must recognize and encourage learner innovations.

Key words: *Innovation, postgraduate research supervision, competence, integrity and tolerance, Kenya*

Curriculum Innovation: The Key to Quality STEM Education for Development in Africa Under the 21stCentury Sky

Prof. Dickson S.O. Owiti, PhD
Department of Science & Mathematics Education
Masinde Muliro University of Science & Technology
owitidick@yahoo.com, dowiti@mmust.ac.ke

Abstract

The relationship between quality STEM education, creativity, competitiveness and economic development has long been acknowledged. While education systems in Africa produce thousands of graduates every year, the continent has remained poor and at the bottom of global comparative indices of science and mathematics education, creativity and innovativeness. Stakeholders have expressed concern over graduates' lack of relevant skills. According to the World Bank's report, 11 million young Africans are expected to join the labour market every year for the next decade. The need to empower the African youth to become a global citizen is thus real under the 21st century education sky.The challenge for us is to equip them with the relevant scientific skills that can allow them to make full and meaningful contribution to societal advancement. Thus the curriculum, mode of teaching and assessment in STEM should be more practical rather than theoretical if we are to instil 21st century skills in the youth and adequately prepare them for the world of tomorrow. This paper presents and discusses some of the reforms and innovations needed in STEM education for meeting the landscape of knowledge economy.

Keywords: *Knowledge economy; curriculum; creativity; innovation; collaboration; practical teaching and assessment.*

A False Start of Science and Technology in Africa: The Case of Kenya

Jackson Too, PhD[1] and Mureithi Njeru[2]

Prof. of Curriculum & Pedagogy, Moi University,

Commission for University Education, jtoo@cue.or.ke

Researcher & Statistical Analyst, Commission for University Education, Mnjeru@cue.or.ke

Abstract

The level of enrollment and staff in Science Technology Engineering and Mathematics (STEM) in Africa still remains low despite the efforts by government and other interest groups. Yet these are the subjects, which are supposed to catapult the continent to greater heights of development. The disconnect between public policy statements and what is obtaining on the ground is disturbing. The situation of enrollment and teaching at university level in Kenya, best exemplifies the sorry picture of these subjects in Africa.A survey conducted in both public and

private universities in Kenya revealed depressing statistics: Out of 539,749 students enrolled in all universities in Kenya, less than 5% are enrolled in each of the following science-related courses: Agriculture, Forestry and Fisheries; Mathematics and Statistics; Engineering; Manufacturing; Architecture; Education Science, Veterinary and Environment. In contrast, Humanities and Arts; Business and Administration; Education Arts and Social Health studies had all their enrollments surpassing 10%.Data obtained for staffing for these courses shows a corresponding pattern where the academic staff for science and technology courses are very few. This scenario negates all efforts that have been claimed to be to promote the teaching and learning of these disciplines in higher education.The conclusion drawn from these findings is that there is a need to review the existing policies, curriculum and pedagogy, entry requirements, learning equipment, staffing, infrastructure, and the funding model of STEM in Africa.

***Key Words**: Enrollment; staffing; discipline; Kenya.*

One Laptop per Child in Kenyan Primary Schools: Moving From Toys to Thinking Tools

[1]Jean Claude Zigama, Ph.D. and [2]**Prof. Jackson K. Too, Ph.D.**

[1]University of Eldoret, Kenya. Email: zijeclau@yahoo.com

[2]Moi University, Kenya. Editor: jjkiprop2002@yahoo.com

Abstract

Over the last two decades, several governments in Sub-Saharan Africa attempted to promote the use of computers to enhance the teaching and learning process. The Government of Kenya is amongst countries embarked on a pharaonic project of equipping all primary school children with laptops and tablets. This paper briefly outlines the introduction of computers in early and primary education and the trends associated with the use of computers in Kenyan primary schools. Within the context of this paper, the term 'ICT tools', an eclectic one, represents the diversity of computer software including databases and spreadsheets, expert systems, WWW and CD-ROMs, simulations and problem solving software, visualization tools and collaborative publishing software. 'ICT use' refers to the use of ICT tools to support learning within a

predominantly constructivist approach, providing students with opportunities to actively engage in constructing their own knowledge and understanding.

***Key Words**: Computer assisted teaching; educational history; educational trends; critical thinking; tool; ICT in education ; WWW; CD-ROM; Kenya.*

Towards Improving Sustainable Funding of Research in Science, Technology, Innovation and Entrepreneurship for Development in Africa

Gichana James Ongwae

Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya

Abstract

This study sought to investigate the determinants of sustainable funding of research in science, technology, innovation and entrepreneurship for development in Africa. It employed desk top research. The continent of Africa has the opportunity to rapidly move towards a science, technology, innovation and entrepreneurship, knowledge-based economy (STIEKE). The study suggested that for this opportunity to succeed, each member Africa state needs to take concrete actions to allocate at least 1% of gross domestic product to research and development to ensure that Africa maximizes ownership and responsibility for its own developmental trajectory.To ensure effective implementation of STIEKE, at regional and continental level, a strategy to mobilize domestic and alternative financial resources should be developed to accelerate implementation and reduce over-dependency on external resources. The study indicated that some African member states demonstrated leadership in establishing national funds for research, innovation and entrepreneurship. A number of member states have also established bi-lateral science, technology and innovation calls for research proposals to promote research collaboration. At the national level, member states need to streamline funding for science, technology, innovation and entrepreneurship in their national development strategies and adapt existing policies to support implementation of a STIEKE economy.The study recommends that domestic resources be mobilized. External technical and financial support should help strengthen the domestic funding base, thus supporting sustainability.

***Key Words**: Sustainable, funding, science, technology, innovation, entrepreneurship*

Positioning SASA in Africa's Development

Emilio Ovuga
Department of Mental Health, Gulu University, Uganda
Email: emilio.ovuga@gmail.com

Abstract

Sub-Saharan Africa has large untapped reserves of natural resources ranging from abundant sunlight to fresh water bodies through plenty of rainfall, mineral reserves and powerful winds. Unfortunately, Africa remains one of the regions of the world where poverty, hunger and disease continue to afflict rural populations unabated. With different cultures, Africa has diverse needs and complex socio-economic and political systems that do not seem to support scientific advancement. Scientific research remains an unattractive field that is poorly funded by central governments, and receives no support from most entrepreneurs. Scientists, on the other hand, are viewed as rich and may be pressured to dish out and share tightly-budgeted research grants with those not involved in core research activities. Science as a professional field is therefore not a lucrative source of income for most in Africa. Changing the scientific *status quo*in Africa requires a bold transformation of science in Africa for Africa so as to eradicate disease, poverty and disease, and make communities a safe place for populations to live in.

Suggested ways to achieve the above include the development of human resources sympathetic to scientific advancement in Africa, the promotion of research as a profession early in the education system, and transformation of society with zero tolerance to corruption. Examples of how some universities and research institutions in East Africa have worked together to advance health sciences research in the region will be shared to generate discussions.

***Key Words:** Africa's development; scientific research; science transformation; research as a profession; Uganda.*

Assessing the Impact of International Science and Technology Collaborations on the Health Sector in West Africa – The Case of Ebola in Nigeria

James, J. I.[1], Yusuff, A. S.[1], Abubakar, K.[1] Emmanuel, O. G.[1]

Science, Policy and Innovation Studies, SPIS Department, National Centre for Technology Management, NACETEM, Federal Ministry of Science and Technology, FMST, Abuja, Nigeria

Judeosagie@ymail.com

Abstract

International collaborations in African nations have attained low pace and this has resulted in negligible science and technological development in Africa. There is a need to heighten linkages created by international science and technology collaborations (ISTCs to increase acquisition of scientific knowledge and innovative technological information over the globe particularly in Africa for local development.

Without proper international collaborations, there would be limited access to developments through scientific knowledge generated by professionals, researchers and academia in other countries, the quality and quantity of scientific knowledge generated nationally would be inadequate, and industries would be unable to obtain innovative technological information and knowledge needed to maintain competitive advantage.

The achievements in the health sector of the West African nations would not have been possible particularly in the Ebola-affected West African states (Guinea, Liberia, Sierra Leone, Nigeria) without adequate international collaborations as having critical mass of health scientists with international knowledge and intercultural skills needed to bridge the globalization gap is pivotal to having an effective and efficient health system in a nation. The paper will critically examine the dynamics of some existing ISTCs in the health sector amongst selected West African states – Liberia, Guinea, Sierra Leone and Nigeria. It will seek to assess their impact in the health sector in West Africa while carefully highlighting the challenges, opportunities and benefits in ISTC engagement for any nation. The role of government, the organized private sector, the industry

and academia for effective engagement of a nation in ISTC would be identified. Also, policy direction that would benefit governments of partnering countries would be indicated. Relevant secondary data would be assessed from the internet, scientific publications and articles from the World Health Organisation, WHO, and governments of other countries, especially governments of affected countries. The data obtained would be analyzed using Statistical Package for the Social Sciences, SPSS. Among others, the study will answer the following questions: how has ISTC enhanced development in the world? What is the extent of African countries' involvement in ISTC? How did ISTC help in the health sector in Africa particularly during the outbreak of Ebola Virus Disease (EVD) in West Africa? What are some of the challenges to engaging ISTC for development in Africa? What are the roles and responsibilities of key actors in ISTC?

Keyword: *Collaboration; ebola; science, technology and innovation; Nigeria*

Promoting R & D in Nigerian Small and Medium Scale Enterprises

Emmanuel, O. G., Jude, J., Yusuff, A. S and Abubakar, K.
National Centre for Technology Management (NACETEM),
Science Policy and Innovation Studies (SPIS), Garki, Abuja Nigeria

Abstract

Research and Development (R&D) is a method of investigation where assumed new scientific knowledge is discovered due to a series of linear and sequential stages that consist of basic research, applied research and development research. It is the dominant approach for technology development and investments in the scientific infrastructures. The continuous investments in R & D and training from large corporations and research institutes are important in enhancing the performance of small and medium scale enterprises (SMEs). Existing evidence shows that lack of government involvement in sponsoring basic research projects capable of bringing out wide range scientific understanding affects the entire SMEs, which are the major source of employment for the teaming youth especially in a developing country like Nigeria. Therefore, there is the need to raise some fundamental questions such as: Is R & D critical to the growth of all SMEs either in services or/and manufacturing sectors in Nigeria? How have SMEs been able to utilize knowledge from R &D? For this study, a total of 200 SMEs will be randomly selected

from a cross section of SMEs spread among all the states of Nigeria, including Abuja. Questionnaires will be developed and administered to these 200 SMEs after which the retrieved questionnaires will be analyzed using the Statistical Package for Social Sciences (SPSS). This study posits that in a situation where R & D is identified to be critical and there is little or no utilization of knowledge either latent or obvious be derived from such R & D, such SMEs will record low performance. However, this gap will better be determined from this study.

***Keywords**: Research and Development, SMEs, Nigeria*.

Potential Benefits of Using Teaching Kits in Inquiry-Based Learning in Geosciences

Macharia N. Anthony

Department of Geography, Kenyatta University, P. O. Box 43844 00100, Nairobi, Kenya

Email: macharia.anthony@ku.ac.ke

Abstract

Geosciences involve studies of natural phenomena that are often presented in simplified forms to enhance the understanding of key principles. In that pedagogical process, it becomes necessary to introduce that complexity in advanced undergraduate and postgraduate levels. At some point, it becomes necessary to organize field trips that expose the students to the complex real-world scenarios, where concepts learned in classroom environments are expected to be articulated to demystify patterns and processes in the real work. The inquiry-based learning through the use of teaching kits provides an abstraction of real-world scenarios that bridges the gap between theory and practice, and provides a transition to enhanced understanding about the complexity of natural phenomena. This paper discusses experiences gleaned from literature of using teaching kits in geosciences, mainly hydrogeology, ecology, and meteorology to demonstrate how such kits provide students with the chance to martial their army of ideas and articulate important concepts to study and understand natural phenomena.

***Key words**: Ecohydrology, Hydrology, Hydrogeology, Meteorology, Teaching kits*

Clothing and Textile Research in Kenya: Challenges and Oportunities

Oigo, E. Bosibori[1]& Isika, Juliet K. [1]

[1]Kenyatta University, Department of Fashion Design and Marketing, PO Box 43844 (00200), Nairobi , Kenya.

Email of corresponding author: ebosiborio@gmail.com or oigo.bosibori@ku.ac.ke

Abstract

This paper traces the history, progression and current status of clothing and textile research at Kenyan universities. The discipline grew from a diploma in domestic science at the University College of Nairobi in the 1960s to its current status of fashion, apparel and textile courses at seven universities. The research trends were traced through analyzing masters and PhD studies in various degrees programmes. The purpose of this research was to: 1) Identify the trends in the clothing and textile researches from the 1990s to the present time.2) Identify challenges that inhibit research in clothing and textile. 3) Propose future areas of research focus in clothing and textile with opportunities for innovation. This study results were based on desk research which reviewed documents on CUE, KUCCPS and University websites; peer reviewed journal articles and published research reports on Kenya's textile and clothing industry. Content analysis of interviews with supervisors of students on industrial attachment revealed themes for future research trends. The researches in clothing and textile were analyzed by area of focus. Results on 66 studies by Masters and PhD students revealed the following themes: 26 on socio-cultural and psychological aspects of clothing, seventeen were on fashion education, twelve on textile science, and eleven on clothing industry, micro and small enterprises. Most researchers employed cross sectional descriptive surveys where the respondents were mostly consumers, students, teachers and industry managers. Government and other agency reports documented limited interaction between the universities and industries leading to underrepresented of research on the Kenyan clothing industry. The results reveal the need to strengthen partnerships and alliances between clothing and textile industry and institutions of higher learning. Research agenda should move towards addressing global trends and emerging issues such as sustainability in production and consumption.

Key Words*: Clothing and Textiles Education, Clothing industry, Fashion Design*

New Innovative Interventions and Evidence towards Malaria Elimination in Rwanda: Experience from MEPR Project in Ruhuha Sector in Bugesera (2011-2016)

Leon Mutesa*, MD, PhD

Associate Professor, College of Medicine and Health Sciences, University of Rwanda, Kigali, Rwanda

Email: lmutasa@gmail.com

Abstract

In 2011, the Netherlands Organization for Scientific Research/ WOTRO Science for Global Development provided competitive research funds for a four-year research project titled "Malaria Elimination Program for Ruhuha (MEPR)". The main objective of this project was to strengthen human capacity development within the Rwandan health sector. The program aimed at demonstrating the multifactorial conditions of malaria in a community, that community participation helps health systems towards malaria elimination, and demonstrate that communities can develop sustainable health interventions in a self-learning environment. The program consisted of four interrelated PhD projects, referred to as the 'four pillars' addressing issues related to behavioral sciences – where the project facilitates the entire program by looking at group dynamics, self- organization, ownership, commitment and intervention design and implementation. The second pillar of biomedical sciences studies malaria-related epidemiology including disease burden, spatial distribution, immunological parameters and surveillance. The third pillar of entomology targets to improve integrated vector management and the integration of this approach in the context of the existing health systems. The last pillar of health economics focuses on studying economic and financial models for sustainable malaria elimination, such as willingness to pay and return on investments. The targeted site of this project was Ruhuha sector located at about 42 km from Kigali, the Capital of Rwanda. It covers an area of about 56 square kilometers with a population estimated to be 19,606 people. The sector is divided into 5 cells and 35 villages with 5,661 households. It is drained by four main wetlands transformed into irrigated rice fields, while seasonal crops occupy the fifth wetland. Malaria was previously reported as high endemic and a serious problem. Due to the government interventions through the distribution of Long Lasting Insecticide-treated Nets (LLINs) with achievement of universal coverage (one LLINs for two persons) and Indoor Residual Spraying with more than 97,5 %

coverage for each Indoor Residual Spray (IRS) round, as well as malaria case management, the burden of malaria has declined drastically *(Rulisa et al 2013; Hakizimana et al. 2014; Kateera et al 2015)*. Despite use of these effective interventions, the prevalence of malaria has not reached the phase of pre-elimination as stipulated in the National Malaria Control Strategic Plan (2013-2018). Therefore, the next steps were to empower the local community to identify the true problem and provide appropriate solutions. A bottom-up participatory approach through an Open Space method was used as well as the creation of "Community Malaria Action Teams" (CMATs) in the framework of Behavior Change and Communication (*Ingabire CM et al 2014*). The major solutions emerging from the open space discussion meetings included: special malaria preventive strategies for vulnerable groups, community ownership of malaria control actions, environmental clearing by cutting bushes and removing mosquito breeding sites, full coverage by availability of mosquito nets for each sleeping space, and empowering community health workers for diagnosis and treatment of adults additionally to the children below the age of five years. These results served as a platform to share results and community-based dissemination workshops organized to formulate sustained community actions for malaria elimination in the area and to orient further operational research. Potential innovative actions taken for a detailed diagnosis of the problem and the appropriate solutions included the use of a bottom-up approach instead of the vertical approach deployed for other vector control interventions from the design, the planning and implantation of activities as well as the introduction of microbial larvicide named "*Bacillus thuringiensis* var. *israelensis" (Bti)* for larval source management. Other innovative interventions included tackling foci of malaria infection, evaluating and establishing immunological aspects of chronic parasitemia. In conclusion, this bottom-up approach was found useful in engaging the local community, enabling them to explore issues related to malaria in the area and suggest innovative solutions for sustainable malaria elimination gains.

***Key Words**: Malaria elimination; innovative interventions; malaria preventive strategies; Rwanda.*

Building and Sustaining Globally Competitive Fashion Design Education: Resources in the Use of Garment Design by Draping

Isika, Juliet K.

Kenyatta University, Department of Fashion Design and Marketing, Nairobi, Kenya

Email: jjisika2011@gmail.com or isika.juliet@ku.ac.ke

Abstract

Problems associated with learning have been identified by researchers as including an unconducive environment i.e. lack of learning materials infrastructure and unclear usefulness of the course. For students using garment design by draping, there are many far reaching implications as there is inadequate literature and research carried out in this area in Kenya. A cross-sectional descriptive survey was carried out in five institutions of higher learning purposively included in the study in Nairobi County. A stratified simple random sampling was used to select a total of 244 students. Learning resources and conditions of facilities in institutions of higher learning were assessed by using a self-administered questionnaire with five point Likert scale. Descriptive statistics were carried out to express the participant's demographic information. A Chi – square test was used to identify independent associations in the use of garment design by draping. A total of 83% of women and 17% of male responded to the questionnaire. Among all respondents 75 % did not use garment by draping while 67.7 % used pattern drafting. Dress makers forms were 'never' available to 53.8% of the students, with studios 'never' available to 46.2% of the respondents. Chi-square results yielded a fairly strong relationship between garment design by draping and pattern development technique taught (V= 0 .646; $p < 0.0001$*) and sources of curriculum (V= 0.623; $p < 0.0001$*).

It was concluded that pattern development technique taught and sources of curriculum are issues associated with garment design by draping. The results depict that majority of the study participants were not learning garment design by draping as it was not prescribed in curriculum. It was recommended that dress makers forms and studios should 'always' be available in fashion design institutions for effective learning in garment design by draping and produce globally competitive fashion design graduates.

***Key Words**: Fashion design education; garment design by draping; institutions of higher learning; Kenya.*

Addressing Human Capital Priorities for a technologically driven nation

Gabriel Juma Okumu – Deputy Director HRD and a PhD, Student at Dedan Kimathi University College.

Telephone: +254721273658 , Email: gjuma@publicservice.go.ke

Prof. Simmy M. Marwa – DedanKimathi University of Science and Technology. Telephone: +254702240275

Email: mwitimarwa@gmail.com

Abstract

According to a study by Mckinsey& Company, the Human Capital (HC) is in a State of "Paralysis". There is too much uncertainty, too many factors to manage, too many unfamiliar operating environments, too little support and too many risks. Around the world, the talent shortage persists. This article will therefore examine the Human Capital Development (HCD) priorities necessary for a technologically driven nation. Besides reviewing the important role HCD plays in economic development, the article will review the state of HC in the 21st Century and then analyze the HC priorities necessary for a technologically driven nation. The article which will be a literature based research will examine HC factors that have played a critical role in technological advancement of the OECD and East Asian Countries. The paper will also examine the human capital priorities in Africa and Kenya in Particular. The paper will then propose appropriate recommendations to be considered by policy makers in order to make Kenya a technologically driven nation. Mckinsey, (2012) describes the state of Human Capital (HC) to be in "paralysis". There is too much uncertainty, there are too many factors to manage, too many unfamiliar operating environment, too little support, too many risks. Educational offerings have not kept pace with this new demand. Around the world, the talent shortage persists. Companies are desperate to find and hire workers whose skills match their needs. According to Almandarez…….. the 21st Century paradigm is shifting towards the enhancement of knowledge as a priority. Human Capital Theory stresses the significance of education and training as the key

to participation in the new global economy. In support of this OECD report asserts that internationalism is an imperative in 21st Century capitalism. Further OECD asserts that internationalism is a means to improve the quality of education and that the success of any nation in terms of human development is largely dependent upon the physical and human capital stock. Most economists agree that it is human resources of nation, not its capital nor its material resources, which ultimately determine the character and pace of its economic and social development. Human Resources constitute the ultimate basis of the wealth of nations. Human Beings are the active agents who accumulate capital, exploit resources, build social, economic and political organizations and carry forward national development. Studies have shown that improvements in education accelerate productivity and contribute to the development of technology thus improving human capital. More than anything else it has been the spectacular growth in East Asia that has given education and human capital their current popularity in the field of economic growth and development. Countries such as Hong Kong, Korea, Singapore and Taiwan have achieved unprecedented rates of economic growth while making large investments in education. The accumulation of human capital improves labour productivity, facilitates technological innovations, increases returns to capital and makes growth more sustainable, which in turn supports poverty reduction. There is a strong correlation between an educated population and technological innovation.

Understanding Drought Characteristics for Sustainable Development in Kenya: A Case Study of Makindu Sub-County, Kenya

*Peter Kinyae Musyimi

Karatina University, Department of Humanities, Karatina, Kenya

* Author's e-mail: pemusyimi@gmail.com

Abstract

In Kenya, meteorological droughts characterize the arid and semiarid lands that constitute approximately 88 % of the total land mass. Episodes of these droughts threaten the country's socioeconomic development. The effects vary from region to region and from one drought

episode to the other.This study examined drought characteristics and associated effects in Makindu sub-county, Makueni County. It established that drought occurred in runs with increasing duration and frequency. The intensity varied from year to year. The effects of drought which included poor agricultural production, water scarcity and distorted socio-cultural activities varied depending on drought characteristics. Severe effects were experienced when droughts were intense, prolonged and frequent. This led to loss of livelihood hence increasing inhabitants' vulnerability to human and environmental shocks. The coping and adaptation strategies were also dependent on drought characteristics.The study concluded that for cost effective and sustainable development, it is important to understand drought characteristics. This will enable policy makers and all stakeholders to put up measures that cushion inhabitants against drought that are sustainable and address the needs of the inhabitants.

Key Words: Meteorological drought; drought resilience; drought characteristics; Kenya.

Understanding Smallholder Farming Behavior under Sustaining Intensification Technologies in Marginal Hotspots in Ghana

Stephen Frimpong[1], Bekele H. Kotu[1], Shaibu Mellon Bedi [2]

[1] International Institute of Tropical Agriculture, Socioeconomics, Ghana

[2] Agriculture Economic and Rural Policy chair group, Wageningen University, The Netherlands

Abstract

To sustainably intensify crop-livestock systems in Ghana's marginal hotspots, the International Institute of Tropical Agriculture (IITA) in the past half-decade, through funding from the United States Agency for International Development (USAID) under the Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) project, has conducted a number of technological trials on cereal-legume-livestock intensification systems in Northern Ghana using the technology park and mother-baby participatory research for development approach. Even though bio-economic estimates show high production and economic potential for the tested technologies over farmer practices, there is limited insight into the selection and use behavior of

these technologies by smallholder participating and non-participating farmers in these marginal areas.

This study therefore uses high frequency cross-sectional data collected immediately after farming operations have been completed by farmers from over two thousand farm plots (>2000) of participating and non-participating farmers from sixteen out of the twenty five Africa RISING intervention communities in Northern Ghana to show smallholder farming behavior under sustaining intensification technologies. Geospatial interpolation and bio-economic simulation using the Arc GIS and the R software respectively were used to analyze the data. Preliminary estimates show that the farming behavior of farmers in selection and modification of sustaining intensification technologies is linked to labour, crop growing characteristics and gender differentials.

Addressing Food Security Issues in Developing Countries Through Solar Cooking and Drying

Suad M. Sulaiman[1] & Salih A. Hamadto[2]

[1]Sudanese National Academy of Sciences (SNAS)

[2]Solar Energy Enterprises Company (SEEC)

Abstract

Trends affecting the key factors of food security are agricultural productivity (including processing, storage and transportation to markets), foreign exchange availability, population growth, and variability in rains and their timing due to climate change. Conflicts in many areas forced people to be displaced to regions where the resources are insufficient. Food and humanitarian agencies managed to reduce food insecurity in many areas, but were recently stressed due to the high demand in several affected regions around the world. Several countries considered agricultural production growth which depends on expanding crop area, improving productivity of the existing lands, or both. However, many major agricultural food production regions in developing countries are remote, with limited access to transportation and no preservation facilities. Post-harvest waste is horrendous and producers can encounter severe financial difficulties. In general, food preservation will resolve many such issues. Of the options available (e.g. cold storage or canning), drying is the simplest. Solar drying (in a controlled

environment) uses free energy for running with the additional merits of low-cost equipment, simple processing, possibility of *in situ* use, and a product that is also available off-season, and of a superior quality to the traditional open sun drying. Solar drying can thus result in a large positive impact on food production and food storage for off-season use. Indicators such as low running costs, improved (dried) food quality, better prices for the producers, higher demand, and, eventually, increased food production, can be readily monitored and measured. Manufacture and dissemination of solar thermal utilities, like domestic dish and box cookers, food dryers and large-scale community kitchens, with units cooking three meals a day for a thousand people have been done in Sudan. The Food and Agriculture Organization (FAO) estimates that women comprise about 43% of the agricultural labour force in developing countries. If women had the same access to productive resources as men, they could increase their farms yield by 20–30%. In many countries, women have less access than men to agricultural assets, inputs, services and to rural employment opportunities. Increasing women's access to land, livestock, education, financial services, extension, technology and rural employment would enhance their productivity and generate gains in agricultural output, food security, economic growth and social welfare.

Wide scale awareness for food drying and use of solar cookers is very desirable. As per the prevailing social practices, the operators are expected to be mostly women. The role of women scientists in the process is vital, as they are naturally closer to the operators. They can play an active role in the development and the dissemination of the technologies, in the training of trainers, and in the preparation of new recipes based on sound scientific principles (physical, chemical and microbiological) that are appealing to different communities.

***Key words**: Food security; solar cooking and food drying; agricultural productivity; food preservation; Sudan.*

Access to Safe And Clean Drinking Water Through Household Connection In The Fast Developing Towns In Nairobi County

Mwarimu Alfred

Kenyatta University, Kenya

lfrdmwrm1@gmail.com

Abstract

Inadequate clean and safe water in sub-Sahara Africa is a chronic burden that seems never to disappear. The causes have recently been traced to the fast growing urban areas, corruption, poor long-term investment strategies and lack of environmental research. Multitude of water challenges result into adverse public health consequences that can be prevented through better access to adequate safe water supply and adequate sanitation facilities. This will be a descriptive cross sectional study, which will identify the burden of water and sanitation problems in some of the fast growing towns in Kenya. The study aims at identifying the number of households that have access to safe and clean drinking water through household connection. It will also assess the burden of water and sanitation related diseases among these fast growing urban centers and finally the study will also identify the various approaches being used by planners and other development partners to improve the supply of clean and safe water. Proportionate sampling will be used to select the rapid growing counties in Kenya and a desktop review of the HMIS and DHS records will determine the disease burden of the water sanitation diseases in the study areas. DHS records, water supply, and sanitation programs data will be used to determine the number of households with household connection. Standard questionnaires, key informant interviews, and observation checklist will be used to assess the various approaches being used to enhance water supply to the rural community. Data will be analyzed using SPSS version 19 and the results will be presented using both tables and figures. The information will enable decision makers to improve on the water supply in these fast developing towns in Nairobi County in order to curb related morbidity and mortality.

***Key Words**: Safe and clean drinking water; safe water supply; sanitation; Nairobi County; Kenya*

ReportCardGuru: The Ultimate Virtual Innovation to Integrating Schools and Community

Jonathan Olak, Ryan Simpson and Morris DC Komakech

York University, Toronto, Canada

Abstract

The United Nations' Millennium Goal was developed to represent a global partnership that has evolved from the commitments at the world summits of the 1990's. That goal, in part, included a target of achieving universal education by 2015. The dream of high-quality, universal, personalized education still remains unrealized and has been rolled over to the Sustainable Development Goals. To achieve this goal, all sectors, including educators, need to embrace innovations. Information technology is key in achieving this dream by providing the ability to produce compelling and individualized content, the means to deliver it, and effective feedback and assessment. Although IT has certainly had a substantial impact in other sectors, its impact in aiding education delivery in sub-Sahara Africa has been modest. We continue to teach students in ways that are virtually unchanged since the invention of the blackboard. ReportCardGuru (RCG), an African/Canadian group of innovators, offers and supports collaborative efforts to develop innovative educational technology applications and services to improve teaching and the teaching experience in sub-Sahara Africa and Africa at large. This presentation is a demonstration of an application of RCG, an educational software that can easily be adopted and used at schools to bring together teachers, school administrators, MOE, students and parents in a revolutionary way. This software will demonstrate how we shall integrate the school and the community in a simple one-touch approach using everyday hand-held smart gadgets to:

- Set academic standards in each content area;
- Gather and analyze data through tests aligned with those standards;
- Use test data and analysis to identify strengths and areas of improvements in the educational system;
- Report student progress to parents on a timely manner;
- Encourage the integration of school and the community in a revolutionary manner; and
- Save every actor money and time.

Key Words*: ReportCardGuru; education innovation; school and community integration*

An Overview of Alternative Cementing Materials, Kenyan Case

[1]Dr. Jackson Wachira Muthengia, [2]Dr. Karanja wa-Thiong'o and [3]Prof. Gerald Muthakia

[1]Embu University College, Kenya

[2]Kenyatta University, Kenya

[3]Dedan Kimathi University of Technology

Contact email: mundu1977@gmail.com

Abstract

Cementing and, in general, construction materials are unaffordable to many middle, as well as lower income citizens. Housing is a basic need for human beings. Housing structures, designs and their construction materials are also dependent on the weather pattern of a given locality. The need for alternative and affordable materials within a given locality is therefore of paramount importance. Housing is related to health. The paper provides an overview of continued research that has focused on alternative cementing materials available in many localities in Kenya. The samples were obtained from various locations including Kirinyaga, Makueni, Embu, Kiambu, Kilifi, and Murang'a Counties. The samples were obtained from regions with high silica- and alumina-rich clays and rice husks and in regions where local brick making is of economic value. Lime used was obtained from waste lime sludge in the process of making acetylene gas. The test materials were incinerated using locally assembled kilns or murfle furnace. The major experimental test methods were compressive strength analysis, pozzolanicity tests, setting time analysis, durability tests (diffusivity of aggressive ions, soundness tests, resistivity and endurance to aggressive media). Results showed that the various test cementing materials met the minimum standard requirements for use as pozzolana – lime cement and/or as active additive to Ordinary Portland Cement (OPC) to make Portland Pozzolana Cement (PPC). The results further suggested that the local incineration technology can be used to make pozzolanic materials for use as cementing material or as additive to OPC.

***Key words**: Pozzolana, bricks, rice husks ash, cement.*

Crystallization Kinetics of InSe Chalcogenide Glasses for Phase Change Memory (PRAM) Applications

Muchira Irene Wanjiku

Department of Physics, Kenyatta University, Kenya

mciku2014@gmail.com

Abstract

Chalcogenide phase change memory is a potential replacement to flash memory due to excellent properties such as high storage density, rapid phase transition and archival stability. Phase change non-volatile semiconductor memory technology is based on an electrically initiated, reversible rapid amorphous-to-crystalline phase change process in multicomponent chalcogenide alloy materials similar to those used in rewritable optical disks. For over a decade $Ge_2Sb_2Te_5$ (GST) compound has been used in fabrication of phase change memory devices. However the material has drawbacks such as low crystallization temperature that reduces its ability to retain data at high temperatures and low crystalline resistance which increases the reset current of phase change memory devices. Therefore there is a quest for new materials which will overcome these draw backs. In the present work, a systematic investigation of crystallization kinetics of InSe alloy has been conducted. Thin films of InSe alloy were prepared by thermal evaporation using Edward Auto 306 evaporation system. Electrical measurements at room temperature and upon annealing at different heating rates were done by four point probe method using Keithley 2400 source meter interfaced with computer using LabView software. The dependence of sheet resistance on temperature showed a sudden drop in resistance at a specific temperature corresponding to the transition temperature at which the alloy changes from amorphous to crystalline. The transition temperature was also found to increase with the heating rates. From the heating rate dependence of peak crystallization temperature (T_p) the activation energy for crystallization was determined using the Kissinger analysis. The films were found to have an electrical contrast of about six orders of magnitude between the as-deposited and the annealed states, a good quality for PRAM applications. The activation energies were determined to be 0.354±0.018eV. In conclusion, the alloy showed good characteristics for a material suitable for phase change semiconductor memory.

***Key words**: Crystallization kinetics; chalcogenide phase change; semi-conductor memory.*

A Paradigm Shift in Social Vulnerability to Nutritional Diseases. A Perspective

Authors: Waswa J, Ngugi L.W. Asiko L A (1) and Ambani R (2)

1. Karatina University -Kenya; Department of Food Science and Nutrition.

2. Bukura Agricultural College-Kenya

Corresponding Author: Dr. Judith Waswa : Email judiwaswa07@yahoo.com; +254719758589

Abstract

For Conference Sub-Theme: Harmonizing Country to Country variations in science policy and government funding of research Vulnerability to nutritional diseases has been for a long time associated with social factors like poverty; gender, more particularly women, and ignorance. Malnutrition was viewed to be more prevalent in rural areas than in urban areas. However, today there is a shift in vulnerability based on these social determinants. Overnutrition is becoming more prevalent than undernutrition, and the diseases associated with over nutrition pose great health, social and economic burdens. The purpose of this study was to analyze the shift in social vulnerability to malnutrition. Kenya Demographic & Health Survey (2008-09) reported a higher prevalence of obesity in the urban areas (39%) compared to rural areas (20%), the higher education and wealth quintiles being the most affected. Women are a vulnerable group due to their physiological needs.

Currently, because violence against men is prevalent, it may be necessary to view this group as vulnerable. Men who are battered by their wives may be denied food leading to reduced food intake. Moreover, the psychological stress they go through may affect their appetite and further exacerbate their condition. There has been a lot of focus on the girl child owing to the fact that culture had made her vulnerable. This focus has been over emphasized, creating a shift of vulnerability. This has been quite evident in the education sector where, in some parts of Kenya, the enrollment of boys is lower. Boys drop out of school and turn out to be alcoholics, reducing their food intake and utilization, and predisposes them to other non-communicable diseases. Alcoholism also makes them economically unproductive and therefore not able to afford food.

The present review concludes that a paradigm shift exists in vulnerability to malnutrition, which should be noted by policy makers and other stake holders. This should be considered during allocation of resources for research and intervention so that a gap is not created in the long run.

***Key words**: Social vulnerability, nutrition, gender, poverty, education, Kenya.*

Innovative Approach towards Curbing the Spread of Tuta Absoluta in Northern Nigeria: Lessons from Research Institutes in Some Selected Countries

Adeyemi, A. O[1], Ademola-Ajibade, A.M.[1], Yusuff, S.A.[1**]

[1]National Centre for Technology Management (NACETEM),

*Department of Planning Programming and Linkages (PPL)

**Science Policy and Innovation Studies (SPIS)

North Central Office, No 3, Dunukofia Street, Area 11, Garki, Abuja Nigeria.

ronky5@yahoo.com

Abstract

Tomato is an edible fruit commonly cultivated in Northern Nigeria where it provides a main source of livelihood to many people. It serves as a source of income and contributes to the economy of the nation. Nigerians largely consume tomato, which is known to be part of a meal in every home. The tomato is consumed in diverse ways, including raw, as an ingredient in many dishes, sauces, salads, and drinks. While tomatoes are botanically and scientifically the berry-type fruits of the tomato plant, they can also be considered a culinary vegetable, causing some confusion. However, tomato farms across some parts of the Northern Nigeria were attacked by a moth called*Tuta Absoluta*. This moth was first known as a tomato pest in many South American countries in 1912. In 2006, it was identified in Spain. The following year it was detected in France, Italy, Greece, Malta, Morocco, Algeria and Libya. In 2009 it was first reported from Turkey. The advance of *Tuta Absoluta* continued to the east to reach Syria, Lebanon, Jordan, Iraq and Iran. Further advances southward reached Saudi Arabia, Yemen, Oman and the rest of the Gulf States. In Africa, *Tuta Absoluta* moved from Egypt to reach Sudan, South Sudan and Ethiopia from the east and to reach the Senegal from the west. It was reported in Nigeria in 2016.

The states majorly affected by this moth are Kano, Jigawa, Plateau, Katsina and Kaduna states. About N1 billion worth of tomatoes are said to have been destroyed in Kaduna State by this pest, which has ravaged farms across the country and led to a nationwide scarcity of tomatoes. This led to declaration of emergency in the area. This outbreak, which is fast spreading has given rise to prices of tomato and its unavailability. Before the outbreak, the price used to sell for one thousand five hundred Naira (N1,500). Post attack, a whole basket of tomatoes containing about one hundred pieces now sells for an average of forty two thousand Naira (N42,000) equivalent to USD212.This study aims to understand how the spread of this moth causing serious damage to tomato farms in the producing states in Nigeria can be curbed. It will adopt a combination of primary and secondary research. Majorly, there will be an in-depth evaluation of various country case studies of how some countries have been able to address this deadly disease. In this effort, special focus will be on the innovative approach research institutes in these countries adopted and to assess the level of success, challenges encountered and finally draw-up lessons for Nigeria research institutes so that this moth can be tackled appropriate, hence mitigating the economic and social implications of this incidence.

Keywords: *Innovation, Tuta Absoluta, Nigeria.*

Novel Materials from Clay and Functionalized Clay Nanoparticles: Application on Remediation of Lead, Cadmium and Pentachlorophenol from Water

David Mutegi Marikah*[1], Wanyika Harrison[1] and Erastus Gatebe[2]

[1]Department of Chemistry; Jomo Kenyatta University of Agriculture and Technology, Nairobi,davidmarikah@gmail.com, hwanyika@gmail.com

[2]Kenya Industrial Research and Development Institute, Nairobi, egatebe@gmail.com

Abstract

The importance of water purification especially removal of both organic and inorganic contaminants has been emphasized again and again, hence the need to develop water purification materials that are cheap, easily available and efficient in order to realize the U.N.'s Sustainable

Development Goals (SDGs) especially SDG 6 (Clean Water and Sanitation).This study involves removal of lead, cadmium and pentachlorophenol from water using clay nanoparticles (CNP), cetylpyridinium chloride and tetradecyltrimethylammonium bromide functionalized clay nanoparticles (C-CPC and C-TTAB, respectively) through batch process.Clay was acquired locally, purified by treating with H_2O_2, NaOH and CNP isolated by sedimentation and centrifugation. The CNP, C-CPC and C-TTAB were characterized using FTIR, XRD and HRTEM were they showed a particle size of 30 nm.CNP had a lead removal efficiency of 88% at initial concentration of 80 ppm and 94% for cadmium at initial concentration of 50 ppm, while C-CPC and C-TTAB had lead removal efficiencies of 98%. For cadmium removal, C-CPC and C-TTAB had 98.2% and 98.6% efficiencies, respectively. In pentachlorophenol (PCP) adsorption, CNP, C-CPC and C-TTAB had removal efficiencies of 85.6%, 87.7% and 84.6%, respectively. Clay being locally available in large quantities in deposits can provide a cheap material for remediation of both organic and inorganic contaminants from water. Isolation of CNP increases its efficiency as evidenced by the high removal percentages.We would highly recommend use of CNP, C-CPC and C-TTAB for remediation of lead, cadmium and PCP from water.

***Key words**: Clay Nanoparticles (CNP), Lead,Cadmium, Pentachlrolophenol, C-CPC and C-TTAB*

Using Polyethylene to Produce Methane and Ethane Gases – Applications for Lighting and Heating

Peter Conic Awory

Moi University, Kenya

Abstract

I was fascinated by an experiment we recently did using polythene to produce a gas ethane and methane gases used for cooking, lighting etc. I wanted to explore further, which is why I chose to study how nylon/polythene can be used to produce the gases. My hypothesis was that the gases are produced after the long chain of hydrogen and carbon bonds is broken down. For my

experiment, I burnt several plastic samples to establish my hypothesis. They all produced a white gas which becomes colorless afterwards. All the polyethylenes produced the two gases subsequently, and the gases showed different characteristics. In conclusion, the white gas burnt with a bright yellow flame making its use for lighting efficient and the colorless gas burns with a blue flame that is good for heating substances.

***Key words**: Polyethylene; methane; ethane; lighting; heating*

Accelerating pico-solar market in Kenya: Role of research and innovation

Dr. Benard Muok[1] and Willis Makoka[2]

Centre for Research, Innovation and Technology (CRIT), Jaramogi Oginga Odinga University of Science and Technology (JOOUST)

[2]Kenya Industrial Research and Development Institute (KIRDI)

Abstract

Access to modern energy services is a key enabler of socio-economic development. An estimated 1.5 billion people continue to live without electricity access and 2.4 billion rely on traditional cooking fuels. More than 95 per cent of these people are either in Sub-Saharan African or developing Asia and 84 per cent are in rural areas.Solar and other renewable energy technologies can significantly enhance energy access thus contributing to economic and social development. Kenya is endowed with vast renewable energy (RE) resources including geothermal, wind, solar, woody and non-wood biomass and hydropower for both on-grid and off-grid systems. Despite the potentials of renewable energy, Kenya's electricity generation is largely based on large-scale hydro power, fossil fuels, and recent focus on geothermal, while other renewable energy sources play only a minor role. Among all the renewables being promoted to enhance energy access, solar energy is the fasted developing renewable energy market. For example from 2000–10, solar photovoltaic (PV) was the fastest growing renewable power technology worldwide. While market led models have played a big role in solar development in Kenya, there is no doubt that a large segment of the population, especially the poor, have been left of this race or at best forced to rely on poor and counterfeit products. The study question to be addressed are: what are there technological or socioeconomic barriers to pico solar adoption; what si the role of research and

innovation and what structures are needed? The objective of this study was to undertake a baseline to determine technical and socio-economic challenges of pico solar PV systems in Kenya. The survey was conducted in 6 counties namely Bungoma, Embu, Kirinyaga, Kitui, Migori and Samburu and interviewed 460 people of which 61% were female and 39% were male. The study identified the following key areas that require urgent action: Manufacturing, Standards and Labels; Fiscal, Marketing and Private Public partnerships; Pico solar energy policy; Consumer policy, Awareness and; E-Waste, Environment and Climate Change. These issues were then subjected to a further discussion by key stakeholders which come up with six policy recommendations. One area that is becoming increasingly clear is the contribution research and innovation. What arrangements and structures are required for research to contribute to solar market development in Kenya?

Key words: *pico-solar, market, research and innovation, policy, manufacturing, e-waste*

Translating innovations into economic growth: rationale for an innovation strategy

Shadrack mule
Department of physical sciences,
University of kabianga,
P.O Box 2020-20300 kericho.
Email: muleshadrack@kabianga.ac.ke

Abstract

Undoubtedly the capability to innovate and to bring innovation successfully to market is a crucial determinant of the global competitiveness of nations over the years. There is growing awareness's among policymakers that science and technological innovative activity is the main driver of economic progress and well-being as well as a potential factor in meeting global challenges in domains such as the environment and health. Not only has innovation moved to centre-stage in economic policy making, but there is a realization that a coordinated, coherent, "whole-of-government" approach is required. In addition to the rapid advances in scientific discovery and in general-purpose technologies such as ICTs and biotechnology, the accelerating

pace of innovation is being driven by globalization. The best antidote to economic stagnation is innovation, the creation of products and services that make life better - whether it's air conditioning, vaccines, or text messaging. For example, 23percentof total USA economic growth from1948 – 2010was generated by innovation. Between 2000 - 2005, this share was as high as 44 percent. Researchers estimate the importance of USA innovation to economic growth will continue: roughly a quarter of productivity growth will be generated by innovations during 2010-2020.Inthe U.S. semiconductor industry, new innovation leads to increased microchip performance along with decreased prices. Because of this unique phenomenon, semiconductor innovation has made it possible for other industries to invest in developing technologies, thereby helping them to grow their own productivity. In fact, IT-using and IT-producing industries are estimated to generate nearly all economic productivity growth in the U.S. economy from2010-2020 (Word Bank, 2014/2015 Report). Many developed countries have adopted national strategic road-maps to foster innovation and enhance its economic impact. Even countries that have generally refrained from active industrial policy in recent years now seek new ways to improve the environment for innovation in order to boost productivity and growth. The United States, for example, came forward with the “Innovate America” and EU’s the “Lisbon Agenda”, which have been updated and strengthened as innovation strategies to drive the much needed economic growth. Africa has excellent capabilities in science and technology research through universities and research organizations though translation of research findings into innovations of economic value to addressing social, economic and technological problems affecting our communities has been inadequate. Without effective country innovation strategy geared towards commercialization of research results, the full benefit to the economy will not be realized.

Keywords*: research, innovation, industry, productivity, strategy*

Towards Exploring the Link between Science, Technology and Innovation in Advancing Africa’s Sustainable Development Agenda: A Case Study of Mobile Money Technology in Kenya

1. W. Simiyu

Great Lakes University of Kisumu, Kibos Main Campus, Kisumu County, Kenya

oliver.wekss@gmail.com

Abstract

Development is a slow, gradual but continuous process which is best explained in terms of increase in national economic wealth. Africa's sustainable development can be simplified into three pillars; social development, economic growth and a safety environment. It meets the needs of the present without compromising the ability of future generations to meet their own needs. In linking sustainable development to Science, Technology and Innovation (STI), arguments on how best to promote sustainable and inclusive development in Africa are incomplete without a full consideration of STI issues. Access to new and appropriate technologies promotes steady improvements in living conditions, which can be lifesaving for the most vulnerable populations and drive productivity gains, which ensure rising incomes. There has been a paucity of evidence based research on how effectively Africa can be able to adapt sustainable development avenues.Technological innovations promote higher economic return through increased employment opportunities created and therefore long term economic growth realized. A glance at the Kenya Economic Survey 2016 evidently indicates that the country's Gross Domestic Product (GDP) expanded by 5.6 per cent from the previous year 2015. This incremental shift was mainly supported by three main pillars: agriculture, real estate and financial services sectors which were majorly propelled by Safaricom's mobile money technology.In expectation of more advances in science and technology and to make Kenya and the entire Africa a hotbed of vibrant success in sustainable development, we need to promote technological research to come up with technological innovations that will steer our continent to greater success in the global market place. This study intends to explore the importance of promoting and encouraging technological and innovation research in delivering and realizing our development agenda as Africa at large.

***Key words**: Sustainable Development; mobile money technology; science, technology and innovation; Kenya.*

Greenhouse Gas Emissions Abatement Potential in Kenya from Introduction of Feebates

Prof. Madara Ogot and Prof. James Nyangaya

Department of Mechanical and Manufacturing Engineering, University of Nairobi, Kenya

Abstract

Climate change is arguably the most serious global challenge today. A key driver of climate change is the continued rapid increase in greenhouse gas emissions (GHG). Although on the global stage, Kenya has not been a significant contributor to GHG emissions, reduction of emissions by all countries will play a significant role in arresting further detrimental changes in our climate. This study investigated the potential of GHG emission abatement from the Kenyan road transport sector through the introduction of "feebates". In 2014, for example, GHG emissions from the road transport sector was estimated at 9.112 Mega Tonnes (MT) of carbon dioxide equivalent (CO2e) and is estimated to rise to 14.4 MT CO2e by 2020. A feebate is a combination of fees and rebates aimed at shifting a consumer's purchase decision, in this case from buying a large high emission vehicles, to smaller more fuel-efficient and lower emission vehicles. Feebates are cost-neutral to the government and therefore easy to implement. The methodology used a previously developed vehicle populations growth model coupled with new vehicle registration data from 2010-2012 to develop a model to estimate future vehicle populations within five engine classes after the introduction of the feebate. Incorporating fuel efficiency data for each engine class, and utilising the Inter-governmental Panel for Climate Change Tier 1 conversion factors for CO2e emissions, the model is able to estimate the abatement potential from the introduction of feebates. From the feebate model, it is estimated that with a target 30% average reduction in purchases of vehicles from the largest three engine classes covering +2,000 cc, in favour of purchases within the smaller two engine classes covering 1,000-1,500 cc, could result in an annual emission reduction of 23.18 kilo-tonnes CO2e by 2022. Feebates, therefore, can play a significant role in Kenya to slow down the rapid growth in the level of GHG emissions from the road transport sector. Further, the developed model enables the performance of scenario analyses enabling informed decision making by policy makers. It can also be updated with the latest available data for improved accuracy.

Key Words: *Feebates; incentive programmes; GHG emissions; Kenya.*

Modelling the Effects of Temperature Variation on Schistosomiasis Transmission Dynamics

Josephine Wairimu Kagunda[1,3], Theresia Marijani[2], Gerald Mligo[2] and Marily Rono[1]

[1]University of Nairobi, Kenya, [2]University of Dar es Salam, Tanzania

[3]Corresponding Author and Transmitting Sponsor

Abstract

Schistosomiasis ranks second behind malaria in terms of its social, economic and public health impact in tropical and subtropical regions of the world. In this study, a non-linear mathematical model is formulated to study the effects of temperature variation on schistosomiasis transmission in the population. We hypothesize that changes in climatic variables as a result of global climate change will cause changes in the epidemiology of infectious diseases, schistomiasis included. The ability of mankind to understand, react or adapt is dependent upon the magnitude and speed of the change. The outcome will also depend on our ability to recognize epidemics early, contain them effectively, provide appropriate treatment, and commit resources for prevention and research. That can only happen if the effect on a particular disease can be measured and analyzed. In this study we incorporate such changes to determine the best strategy to tackle schistosomiasis threat in light of climatic variables variation. The methodology followed rests on a mathematical model whose features include considerations of reproduction number, equilibria, and stability. The model results reveal that the disease-free equilibrium point is locally asymptotically stable when $R_0 < 1$ and unstable when $R_0 > 1$. The endemic equilibrium is locally asymptotically stable for $R_0 > 1$, and otherwise undergoes backward bifurcation. Sensitive indices of parameters in the basic reproduction number R_0 are evaluated. The infection rate $\beta(T)$ is temperature-dependent and there is high infection with rise in temperature and low infection with a decrease in temperature. We find that the infection rate is temperature-dependent with high infection with rise in temperature and low infection with a decrease in temperature. We show that the periodic outbreaks of infectious snails to the aquatic environment are followed by epidemic outbreaks in the human population. We conclude that an integrated and sustainable approach to control disease transmission is best done by taking into consideration the seasonal

fluctuations of population densities of the intermediate hosts and the pathogens due to temperature variation. Thus, targeting increased awareness campaigns of possible outbreaks would help the host populations take measures of self-protection and caution. Other strategies aimed at increasing the death of intermediate host would bring significant results to the war against schistosomiasis.

***Key Words**: Schistosomiasis; miracidia; cecaria; bifurcation; stability analysis,\; sensistivity analysis.*

Pathways of nitrobenzene degradation in horizontal subsurface flow constructed wetlands: Effect of intermittent aeration and glucose addition

Authors: Wesley K. Kirui, Shubiao Wu, Simon Kizito, Pedro N. Carvalho, Renjie Dong

Abstract

Intermittent aeration and addition of glucose were applied to horizontal subsurface flow constructed wetlands in order to investigate the effect on pathways of nitrobenzene (NB) degradation and interactions with microbial nitrogen and sulphur transformations. The experiment was carried out in three phases A, B and C consisting of different NB loading and glucose dosing. For each phase, the effect of aeration was assessed by intermittently aerating one wetland and leaving one unaerated. Regardless of whether or not the wetland was aerated, at an influent NB concentration of 140 mg/L, both wetlands significantly reduced NB to less than 2 mg/L, a reduction efficiency of 98%. However, once the influent NB concentration was increased to 280 mg/L, the aerated wetland had a higher removal performance 82% compared to that of the unaerated wetland 71%. Addition of glucose further intensified the NB removal to 95% in the aerated wetlands and 92% in the unaerated. Aeration of wetlands enhanced NB degradation, but also resulted in higher NB volatilization of 6 mg m-2 d-1. The detected high concentration of sulphide 20-60 mg/L in the unaerated wetland gave a strong indication that NB may act as an electron donor to sulphate-reducing bacteria, but this should be further investigated. Aeration positively improved NB removal in constructed wetlands, but resulted in higher NB volatilization. Glucose addition induced cometabolism to enhance NB degradation

Screening of Beauveria bassiana Isolates for Endophytic Activity – Effects on Growth of Tomato Varieties

[1,2,3]C.A. Omukoko, [1]L.Turoop, [5]S.V.W. Wekesah, [2]K.N. Maniania and [4]Ghimire

[1]Department of Horticulture, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya; [2]International Centre of Insect Physiology and Ecology (ICIPE), Nairobi, Kenya; [3]Chuka University, Chuka, Kenya; [4]International Livestock Research Institute (ILRI), Nairobi, Kenya; [5]Finlays Horticulture, Kenya

Abstract

Tomato, *Lycopersicon esculentum* Mill, is among the most widely cultivated vegetable crop in Kenya. The entomopathogenic fungus *Beauveria bassiana* is not commonly reported as a natural endophyte but its use as an artificial endophyte has been documented. This study aimed to evaluate the effect of endophytic *B.bassiana* on the growth of tomato plants and also to determine the endophytic activity of this fungus. Five isolates of *Beauveria bassiana* ICIPE 273, ICIPE 279, ICIPE 283, ICIPE 10 and ICIPE 35 were evaluated on three tomato varieties: Cal J, Kilele and Anna F1. Tomato seeds were surface sterilized and soaked for 2 hours in *B. bassiana* solution at a concentration of 1 x 10^9, control seeds were soaked in sterile distilled water in 0.01% before planting in sterile soil in pots in a growth chamber maintained at 70% relative humidity and 12:12 day and night lighting. Plants were watered on demand and received Hoagland's nutrient solution on a weekly basis. Plant parts' roots, stem and leaves were harvested after every two weeks. Culturing method was used to detect endophytic *B.bassiana* growth. After four weeks, the experiment was terminated and plant growth parameters were taken. We were able to establish ICIPE 35 as an endophyte in all the three tomato varieties (Cal J, Kilele and Anna F1) and significantly increased plant height, number of leaves, fresh root weight, fresh shoot weight, and dry root and shoot weight when compared to the untreated control. It was also isolated from roots, shoots and leaves of the tomato varieties.

Key words: *Biocontrol; entomopathogen; fungi; pest; tomatoes.*

Management and Preservation of Indigenous Knowledge for Food Security and Natural Resources by Selected Rural Communities in Kenya

Kilemba Lucas M.
University of KwaZulu-Natal, Pietermaritzburg, South Africa
Mobile+254(0)734 658544/700506636 (Kenya); +27(0)616229047/612302746 (South Africa) email: lkilemba@yahoo.com

Abstract

The recognition of the importance and value of Indigenous Knowledge (IK) in agricultural development and food security is almost lacking in the modern technological world. Reviewed literature shows that there is a knowledge gap in the management, preservation and use of IK for food processing, production, food security and poverty alleviation, especially in the rural communities which hitherto had been their tradition. This knowledge gap is indeed widening and measures need to be taken now rather than later to document and preserve it before all is lost. This study examines the management and preservation of IK for food security in rural communities in Kenya. Specifically, it will examine the IK systems used by the rural women of Nyanza, the Maasai in Loitoktok and the Taitas in processing fish, meat and traditional leafy vegetables (TLVs), respectively, and how this enhances food security and poverty alleviation in those communities. The Government of Kenya (GoK) and other organizations have made attempts to preserve and protect IK — also known as Traditional Knowledge (TK) — through the National Policy on Traditional Knowledge Genetic Resources and Traditional Cultural Expressions, and through a "concept note" from the then Ministry of Higher Education Science, Technology and Innovation in Kenya. These efforts in documenting and preserving IK are discussed as well as how modern scientific technology can complement IK for successful agricultural farming methods and food production. Additionally the study also aims to add and enhance the existing traditional methods blending them with modern technology so they can be replicated elsewhere in the country through knowledge transfer. The study further aims to integrate IK to the youth through the formal education system for continuity and to promote it within policy makers with the possibility of establishing a National Centre for Indigenous Knowledge and IK Resource Centres at County Level(s). Since IK is usually transferred to

selected members of a community or family, it is hoped that these new IK Centres and integrated curriculums in academic institutions will derail the extinction of IK, enhance food security and also avoid the situation where when an elder dies a whole library dies with them.

***Key Words**: Management; preservation; i knowledge; knowledge transfer; school curriculum; food security; poverty alleviation; rural communities; South Africa*.

Determination of the Effect of Transgenic and Conventional Gypsophila root Exudates on Infectivity and Development Entomopathogenic Nematodes

Ngugi, C.N., Waturu, C.N., Wepukhulu, S.B., Nguru, J.K., Kamau, L.G., Kimani, A.W and Wangoh, R.W.

Abstract

Transgenic *Gypsophila paniculata* (L) cultivars with colours ranging from dark purple and red to light pink have been developed through Genetic engineering. Entomopathogenic nematodes (EPNs) are insect parasitic nematodes occurring naturally in soil environments. There was need to determine the effect of transgenic and conventional *Gypsophila* root exudates on the infectivity and development of EPNs *Steinernema karii* and *Heterorhabditis* spp. Potted *Gypsophila* plants were inoculated with 15,000 infective juveniles (ijs) of the two EPN species. The *Galleria mellonella* larvae were used for baiting the EPNs and ijs were recovered using the White Trap method. The control had the highest mean larval mortality 2.77 ± 0.17, which was significantly different (p=0.0001) between treatments.The *Heterorhabditis* spp infectivity in the control was highest with mean larval mortality of 3.37 ± 0.26, which was significantly different (p=0.0040) between treatments. There was no significant difference (p=0.2256) between*Heteroharbditis species* ijs recovery among treatments, but for *S. karii*, the difference (p=0.0307) was significant, Infectivity and development of the two EPNs was observed in all the treatments since *G. mellonella* mortality was recorded and ijs recovered. The mortality *G. mellonella* and ijs recovery was due to infectivity and development of the EPNs and not adverse effect of *Gypsophila* root exudates. We conclude that the *Gypsophila* root exudates do not have a negative effect on infectivity and development of EPNs.

***Key Words**: Genetic engineering; Gypsophila; transgenic; root exudates, entomopathogenic nematodes; development and Infectivity*

Enhancing Performance of Agribusiness through an Automated Inter-County Commodity Exchange Market in Kenya

Alexander Kinyua Wachira
Meru University of Science and Technology, Kenya
Phd Candidate (Finance) and Lecturer
Department of Accounting and Finance, Meru University, Kenya
kinyuaaw@gmail.com

Abstract

Being an agricultural country, Kenya has most of her rural populace engaging in agriculture However, over the past few years, the market for agricultural commodities has shown a pattern of long term fall in prices and short-term price instability. This affects farmers and government, both of which face shrinking returns and high risk. Following promulgation of the current constitution, Kenya has a devolved form of governance, with 47 counties. Every county is an economic block and different counties are endowed differently. Production of certain commodities is localized but consumption is widespread throughout the country. In addition, production of such products is seasonal but consumption is throughout the year. Thus we have some areas/seasons with plenty of produce fetching very low prices and other areas/seasons with scarcity of the same commodities and attracting high prices. Next, farmers especially small scale farmers go to the market without prior knowledge of market prices. They are usually at the mercy of middlemen with whom they privately negotiate the price. Thus lack of transparency in the trading system leads to low returns to a farmer due to less empowerment and less price bargaining power. It is against the above background that an automated inter county exchange market is proposed so as to facilitate information sharing of commodities availability in different markets and their corresponding prices. A functional automated exchange market would require installation of a central gathering point of commodity information from each county headquarters market. This means 47 gathering points in the country. The commodity information should then be shared in real time with all other exchanges. An individual user should be able to access this

information in real time from a remote terminal or from a smart phone. This would in turn bring together many buyers and sellers at any point in time, price discovery, better returns to farmers resulting in better performance of agribusiness in Kenya and subsequently more revenue to the government.

Effects of Organic and Inorganic Fertilizers on Seed Quality of Upland Nerica Rice Varieties in Siaya County, Kenya

Martha A. Odhiambo[*], Catherine W. Muui, and Mukiri Githendu

Department of Agricultural Science and Technology, School of Agriculture and Enterprise Development, Kenyatta University, Nairobi, Kenya.

[*]Corresponding Author. E mail: odhiambom2012@gmail.com

Abstract

To evaluate the effects of the combined application of organic and inorganic fertilizers on the resultant seed quality of four NERICA rice varieties (NERICA 1, NERICA 4, NERICA 10 and NERICA 11), field experiments were conducted in 2015 at the Agricultural Training Center, Siaya County, Kenya, using a completely randomized block design with three replications. The treatments were: No fertilizer, organic manure (farmyard manure, 10 tonnes per hectare), recommended NPK, and ½ NPK + ½ FYM. The harvested seeds were subjected to seed quality tests in the laboratory to determine viability, vigor, and health after three months storage. Seed viability was determined by germination percentage, potential seed longevity and the proportion of high density grains. Seed vigor was determined by measuring seedling length and dry weight, mean germination time and electrical conductivity. Data on percentage pathogen incidence was used to record post-harvest seed health after three months storage. Analysis of variance was done and means separated by least significant difference at 5% significance level. The results showed that viability, vigor and seed health of NERICA rice were significantly ($p \leq 0.05$) affected by applications of fertilizer in the mother plant field, variety, and interaction of variety and fertilizer. The results also showed that electrical conductivity, potential seed longevity, percentage germination and pathogen incidence were influenced more by mother plant nutrition than genotypic effects. Combined maximum values for most characters such as germination

percentage (95%), 1000 – seed weight (29.3 g) and vigor index (2209) were recorded with integrated application of organic and inorganic fertilizer. Therefore, application of 5 tonnes/ha farmyard manure incorporated with 50 % NPK can significantly increase rice seed quality and sustain its productivity over years. Further, it contributes in reducing the cost of inorganic fertilizer by 50 %, which has been a bottleneck to many smallholder farmers.

Key Words*: Organic and inorganic fertilizers; seed quality; Nerica rice varieties; Siaya County, Kenya.*

Effect of early childhood stunting on learning achievement among children from poor urban households in Nairobi, Kenya

Maurice Mutisya[1, 2], Email; mmutisya@aphrc.org,
Moses W Ngware[1], Email; mngware@aphrc.org
Caroline W Kabiru[1], Email; ckabiru@aphrc.org
Ngianga-Bakwin Kandala[3] Email; Ngianga-Bakwin.Kandala@lih.lu

Abstract

[1]African Population and Health Research Center; [2] University of the Witwatersrand; [3] Department of Mathematics and Information sciences, Faculty of Engineering and Environment, Northumbria University, Newcastle upon Tyne, UK.

Background: The early years of child development are crucial and have effects on later life chances. Disruptions such as malnutrition during this stage of development can be detrimental. Despite this importance, the effect of malnutrition during early years of life on schooling in low- and low middle income countries, more so among the urban poor populations, remains poorly understood.

Methods: We nested a schooling survey on an existing longitudinal framework to study the effect of stunting, along term measure of chronic malnutrition on learning achievement in literacy and numeracy among 1163 children aged between 5 and 8 years living in poor urban households in Nairobi, Kenya. Stunting was measured by Height for Age Z-scores as defined by WHO and categorized as stunted growth, catch up growth and not stunted. Literacy and

numeracy achievement was by an oral assessment which measured basic competencies given the age of the children. Household food insecurity was computed from a set of four items as described in Radimer framework. We used Structural Equation Modelling (SEM) to estimate the direct and indirect effect of stunting and food security on learning achievement controlling for other covariates. In addition, we conducted propensity score matching technique, which mimics estimation of the impact of an intervention for observational studies in order to check the robustness of the SEM results.

Results: Almost two-thirds (63%) of the children were stunted by age two and only one third came from households that were categorized as food secure. Stunted children had significantly lower literacy (-0.296) and numeracy scores (-0.190) than non-stunted children. The effect of stunting on learning achievement was significant after the robustness check using propensity score matching technique. The effect of stunting on achievement was pronounced among children who experienced prolonged stunting than those who recovered from stunting or were not stunted at all. Food insecurity was not significantly associated with learning achievement.

Conclusion: The high proportion of stunted children in the study context underscores a need for interventions to prevent child malnutrition, as well as to identify and provide extra support to stunted children in order to ensure that they overcome the potential negative effects of malnutrition on educational and associated outcomes. As a first step, synergies between health and education providers will be critical in addressing the high rates of malnutrition and its effects on the schooling of children living in informal settlements.

***Key words**: Stunting, food security, literacy, numeracy, cognitive, achievement, urban poor, Kenya*

Determinants of access to healthcare by older persons in Uganda: A cross-sectional study

Stephen Ojiambo Wandera1, 2,* Email: swandera@gmail.com Betty Kwagala[1] Email: kkwagala@gmail.com James Ntozi[1] Email: jntozi@gmail.com

1 Department of Population Studies, School of Statistics and Planning, College of Business and Management Sciences, Makerere University, P.O. Box 7062, Kampala, Uganda 2 Consortium for Advanced Research Training in Africa (CARTA cohort 2) Fellow at the African Population and Health Research Centre (APHRC), Nairobi, Kenya * Corresponding author.

Abstract

Background

There is limited research on older persons' healthcare disparities in Uganda. Therefore, this paper aimed at investigating factors associated with older persons' healthcare access in Uganda, using a nationally representative sample.

Methods We conducted secondary analysis of data from a sample of 1602 older persons who reported being sick in the last 30 days preceding the Uganda National Household Survey. We fit generalized linear models (GLM) with the poisson family and the log link function, to obtain incidence risk ratios (RR) of accessing healthcare in the last 30 days, by older persons in Uganda. Also, we report experiences of older persons from qualitative data.

Results More than three quarters (76%) of the older persons accessed healthcare in the last 30 days. Access to healthcare in the last 30 days was reduced for older persons from poor households, with some walking difficulty; or with a lot of walking difficulty. Conversely, accessing healthcare in the last 30 days for older persons increased for those who earned wages and missed work due to illness for 1–7 days, and 8–14 days. In addition, those who reported non-communicable diseases (NCDs) such as heart disease, hypertension or diabetes, were more likely to access healthcare during the last 30 days. Conclusion In the Ugandan context, health need factors (self-reported NCDs, severity of illness and mobility limitations) and enabling factors (household wealth status and earning wages in particular) were the most important determinants of accessing healthcare in the last 30 days among older persons. Challenges of availability of drugs, skilled personnel and attitudes of healthcare providers were critical barriers for access to care.

Role of Sustainable Procurement Practices on Supply Chain Performance of Manufacturing Sector in Kenya: A Case of East African Portland Cement Company

Nyile Erastus Kiswili

Masters student, Jomo Kenyatta University of Agriculture and Technology, Department of Procurement and Logistics, School of Entrepreneurship, Procurement and Management

P.O. Box 62000-00200, Nairobi, Kenya

Email: nyileras@gmail.com

Shale Noor Ismail (PhD)
Lecturer, Jomo Kenyatta University of Agriculture and Technology, Department of Procurement and Logistics, School of Entrepreneurship, Procurement and Management
P.O. Box 62000-00200, Nairobi, Kenya
Email: shalle60@hotmail.com

Bellah Chepkulei
Lecturer, Taita Taveta University College, Department of Business Studies and Economics, School Business Economics and Social Sciences
P.O. Box 635-80300, Voi, Kenya
Email: belatoo2004@gmail.com

Abstract

Sustainable procurement practices has been institutionalized and adopted by regional and local Administrations, national governments and international organizations. The need to buy sustainably is due to the increasing global population and growing consumption rates per capita. The resources on which we rely on are being depleted at accelerating rates. In essence, it is no Longer firm competing against firm rather; it is supply chain vs. supply chain. In the contemporary Society, a business that is purely driven by maximizing profits without due consideration for its Environmental impact stands meager chances of advancing to a sustainable future. Corporate Leaders in the contemporary world continue to face the challenge of running competitive and

Profitable organizations while at the same time meeting broad social and ethical responsibilities. The purpose of this study was to examine the role of sustainable procurement practices on the Supply chain performance. The study adopted a case study research design. The target population of interest in this study consisted of staff members at EAPCC headquarters in Machakos County. This research adopted a stratified random sampling technique in selecting the sample. The study used primary data, which was collected through use questionnaires. The study also made use of

secondary sources of information. Data was classified, tabulated and summarized using descriptive measures while tables were used for presentation of the findings. Pearson's correlations coefficient was run to examine the relationship between the independent and the dependent study variables that are set out in the objectives of the study. The study findings indicated that 76.3% of change in Supply Chain Performance at EAPCC can be explained by four variables namely Procurement Preferences and Reservations, Green Procurement Practices, Supplier Involvement
and Electronic Procurement. According to the research findings, sustainable procurement practices at EAPCC had been fully implemented. Effects of Procurement Preferences and Reservations, Green Procurement Practices, Supplier Involvement and Electronic Procurement were found to be statistically significant with a positive impact on supply chain performance. The study recommends that it is imperative that organizations start to view sustainable procurement as strategic in value. Following the results of the study, it is evident to conclude that there is a positive relationship between Sustainable Procurement Practices and Supply Chain Performance. Through
procurement preferences and reservations, adoption of green procurement practices, involvement of suppliers and the use of integrated procurement systems, EAPCC has continued to be at the heart of Kenya's economic success story.

***Keywords**: Electronic Procurement, Green Procurement, Preferences and Reservations, Supplier Involvement, Supply Chain Management, Sustainable Procurement.*

Invitation Cards during pregnancy enhance male partner involvement in Prevention of mother to child transmission of Human Immunodeficiency Virus in Blantyre, Malawi:

A.L Nyondo-Mipando [1],A.T Choko[2] , A.F. Chimwaza[3] and A.S. Muula[1]

Email: lindaalinane@gmail.com

School of Public Health and Family Medicine, College of Medicine, University of Malawi, Blantyre, Malawi

Malawi Liverpool Wellcome Trust Clinical Research Programme, Blantyre, Malawi

Kamuzu College of Nursing, University of Malawi, Blantyre, Malawi

Abstract

Introduction

Male involvement is vital for the uptake of prevention of mother to child transmission of human immunodeficiency virus interventions. Partner notification is among the strategies identified for male involvement in prevention of mother to child transmission of human immunodeficiency virus services. The purpose of this randomized controlled trial was to evaluate the efficacy of an invitation card to the male partners as a strategy for male involvement in prevention of mother to child transmission of human immunodeficiency virus services, by comparing the proportion of pregnant women that were accompanied by their partners between the intervention and non-intervention study groups.

Methods: Pregnant women attending antenatal care without a male partner in South Lunzu and Mpemba health centers were enrolled in the study from June to December 2013. In an intention-to-treat analysis, we compared all participants that were randomized in the invitation card group with the standard of care group. Risk ratios (RR) with 95% confidence intervals (CI) were computed to assess the efficacy of the invitation card.

Results: Of the 462 randomized women, 65/230 (28.26%) of the women in the invitation card group reported to the antenatal care clinic with their partners compared to 44/232 (18.97%) women in the standard of care group. In an unadjusted intention to treat analysis women in the invitation card group were 50% more likely to be accompanied by their male partners than those in the standard of care group with RR: 1.49 (95% CI: 1.06-2.09); p = 0.02. Having adjusted for clustering by site of recruitment, women in the invitation card were still more likely to be accompanied by their partners than women in the standard of care group, adjusted RR: 1.49 (95% CI: 1.30- 1.71); p< 0.001.

Conclusion; An invitation card significantly increased the proportion of women who were accompanied by their male partners for the services.

Recommendation: Adopt an invitation card as a strategy for male involvement

Effect of Fish Oil Omega-3 Fatty Acids on Reduction of Depressive Symptoms among HIV-seropositive Pregnant Women: A Randomized Double-blind Controlled Trial

Authors: [1,5]**Rose Okoyo Opiyo**, [2]Reuben Kamau Koigi, [3]Anne Obondo, [4]Dorington Ogoyi, [5]Wambui Kogi_Makau

Authors' Affiliations

[1]School of Public Health, University of Nairobi, Nairobi, Kenya;
[2]Department of Obstetrics and Gynecology, University of Nairobi, Nairobi, Kenya;
[3]Department of Psychiatry, University of Nairobi, Nairobi, Kenya;
[4]School of Biochemistry & Biotechnology, Technical University of Kenya, Nairobi, Kenya;
[5]Department of Food Science, Nutrition & Technology, University of Nairobi, Nairobi, Kenya.

Abstract

Background: Globally, it is known that HIV-infected pregnant women are prone to depression. Evidences also suggest that nutrient deficiencies may enhance the depressive illness, and, that fish oil omega-3 fatty acids may alleviate the depressive symptoms. This study aimed at assessing the effect of fish oil omega-3 eicosapentanoic acid-rich supplements on depressive symptoms among HIV-seropositive pregnant women.

Methods: A randomized controlled trial, double-blinded to participants and those administering the intervention, was conducted with two parallel groups of fish oil omega-3 as intervention and soybean oil as control for eight weeks. Participants were HIV-seropositive pregnant women enrolled in prevention of mother-to-child transmission programs and attending antenatal clinics at selected Nairobi city county's health facilities. Recruitment was conducted from health records of HIV-infected pregnant women with support of health facility personnel. Data analysis followed per-protocol analysis method with participants who completed the 8-week trial included in the analysis of covariance statistical model with omega-3 as the main effect and participants' baseline characteristics and nutrient adequacy as covariates in change in BDI-II depressive symptom score outcome.

Results: The study recruited 282 participants and randomized 109 to receive fish oil and 107 to receive soybean oil. Completion rate was 78.9% (n=86) in experimental group and 89.7% (n=96) in control group. Participants in both groups had mild to severe depressive symptoms (Fish oil: mild=43.1%, moderate=42.2%, severe=14.7%; soybean oil: mild=43.0%, 44.8%, 12.1%) before

randomization. At the end of the trial, at week-8, more than 95% of participants in both intervention groups had minimal to mild depressive symptoms (Fish oil = 95.3%, Soybean oil=97.9%). The intervention effect, all baseline attributes held constant, was not statistically significant (1.01 (95% CI: -0.58 – 2.60), p=0.21).

Conclusion: Fish oil omega-3 eicosapentaenoic acid-rich supplementation with a daily dosage of 3.17 grams (eicosapentanoic acid=2.15 grams; docosahexaenoic acid=1.02 grams) is not effective in reduction of depressive symptoms among HIV-infected pregnant women with mild, moderate and severe depressive symptoms. The fish oil omega-3 supplements were however well tolerated, with no adverse side effects among the HIV-infected pregnant women.

Key words: Omega-3, Depression, HIV infection, pregnancy, RCT

Opportunities in Bioeconomy as a Template to Industrialization: A Lesson for Kenya to Learn

Njiruh Paul Nthakanio
Department of Agricultural Resource Management,
Embu University College
PO Box 6 - 60100, Embu, Kenya
Email: njiruhpaul@gmail.com

Abstracts

Modern Biotechnology and Genetic Engineering is emerging as a major industrial sector as various research outputs are turned into products. This is within a process referred to as Bio manufacturing or Bio industrialization. The integrated economy emanating from bio based goods and services encompass what is known as Bio economy or biotechnology. In Kenya, the major challenge is that a huge portion of bio-sciences is still at theoretical level in spite of the many tools to turn it into industrial products and services. Numerous tools in areas of DNA, RNA, Protein and other Biological macro molecule extraction and analysis such has electrophoretic techniques have been developed. This is the reason why policy and regulation framework in bio manufacturing is urgently needed to enable Kenya tap into this key sector. The objective of this paper is therefore to outline the major opportunities and end user products associated in biotechnology industry. This is a key industry in wealth and job creation. Various opportunities

include direct production of goods, service providers, and equipment and material designs. Bio based goods include; drugs, vaccines, food and feeds, biofuels, pesticides, bio plastics, bio refineries, Nano-bio products, bio-weaponry, bio fertilizers among others. In addition, service providers includes; molecular diagnostics, waste biodegradation, forensics in animals and plants, teaching and research, regulators of biotechnomy, bioinformatics data repository, bio-data mining, and policy making (laws and policies). On the other hand material and equipment design includes; Vitamins, proteins, dyes, gums, oils, polysaccharides among others. Many big player companies like Genetech, QiaGen, Monsantos, Applied Biosystems, Sigma among others have emerged from the area of biotechnology. These can be used as templates in the processes of Kenya's industrialization. Thus, Bioeconomy form a sizeable component of the global economy and Kenya needs to embrace it as a key driver of its vision 2030.

***Key words**: Bio-economy, Bio manufacturing Bio industrialization biotechnology,*

The Odyssey of Human Vaccination and Africa

Alain L. Fymat

International Institute of Medicine and Science, California, U.S.A.

Email: alain.fymat@fiimas.org

Abstract

The odyssey of human vaccination began in 1721 when Lady Mary Wortley Montagu brought to the West, and showed to the British King's physician (Hans Sloane), information regarding the deliberate inoculation of the smallpox virus ("variolation" or smallpox vaccination) and of cowpox "vaccination". This ushered in the era of vaccines that continues to day unabated. As applied in 1796 to a young 8-year old boy by Edward Jenner (a surgeon/apothecary), cowpox vaccination proved to be safe and effective at preventing smallpox, and much safer than smallpox vaccination. Though still widely practiced in the late 19th century England, smallpox vaccination was banned in 1840. The second generation of vaccines was introduced in the 1880s by Louis Pasteur who developed vaccines for chicken cholera and anthrax. Beginning from the late 19th century, vaccines were considered a matter of national prestige, and compulsory vaccination laws were passed. The 20th century saw the introduction of several successful vaccines, including those against diphtheria, measles, mumps, and rubella. Major achievements

included the development of the polio vaccine in the 1950s, and the eradication of smallpox during the 1960s and 1970s. They are one of the great successes of the 20th century's public health. After potable water, an important issue in several African countries, these are the interventions that have most reduced mortality, even more than antibiotics. They have eradicated terrible diseases such as smallpox from the planet and succeeded in significantly reducing mortality due to other diseases such as measles, whooping cough, polio and many more. Maurice Hilleman was the most prolific of the developers of the vaccines in the 20th century. As vaccines became more common, many people began taking them for granted. The World Health Organization (WHO) reports that licensed vaccines are currently available to prevent or contribute to the prevention and control of twenty-five infections. However, vaccines remain elusive for many important diseases many of which affect Africa, including Herpes Simplex, Malaria, and HIV.

After describing what is a vaccine, its content (agent resembling a disease-causing microorganism, toxins, surface proteins), its mimicking of the body's immune system, and its prophylactic or therapeutic effect, I will discuss the vaccine's effectiveness, efficacy or performance, and its controlling factors. It will also consider the lack of response to vaccination as commonly result from clinical factors such as diabetes, steroid use, HIV infection such as occurring in several African countries, age and possibly genetic reasons. Genetics is of consideration if the host's immune system includes no strains of B-cells that can generate antibodies suited to reacting effectively and binding to the antigens associated with the pathogen. I will also dwell on the adverse effects and risks of vaccines, which manifest themselves like for any other pharmaceutical drugs. I will also review the various vaccine types: inactivated, attenuated, recombinant, toxoid, protein subunit, conjugate, heterotypic, plasmids (or replicons) and experimental (dendritic cells, recombinant vector, DNA vaccination, T-cell receptor, and targeting of identified bacterial proteins).

Of special importance to Africa and one of its continuing challenges is the economics of vaccine development. Many of the diseases most demanding a vaccine, including HIV, malaria and tuberculosis, exist principally in poor countries. Pharmaceutical firms and biotechnology companies have little incentive to develop vaccines for these diseases, because there is little

revenue potential. Even in more affluent countries, financial returns are usually minimal and the financial and other risks are great. Further, the filing of patents on vaccine development processes is an obstacle to the development of new vaccines.

***Key Words**: Human vaccination; vaccines; genetics; economics of vaccine development; vaccine patenting; Africa.*

Environmental Sustainability and Sustainable Development: A Global Compact Instrument Disclosure from African Universities

Moses Makokha Wandera
Cooperative University College of Kenya
Email: mwandera@cuck.ac.ke

Abstract

The United Nations Global Compact (UNGC) instrument has been a milestone in understanding sustainable development. The triple down approach is based on social, environmental and economic principles with roots from the Brundtland Report of 1987. The UNGC instrument and its mainstreaming has also been applied in the African universities.

The study sought to bring the above instrument on its key areas of application on sustainable development, mainly environmental sustainability and mainstreaming model. As key objectives of the study, this was done in African universities during the year 2008 and using a census survey design on the African public universities that participated. The study used stakeholder and sustainable resource theory, with study population of the universities that participated in the mainstreaming model, including Kenya. Lessons from the Kenyan universities that participated are given with new emphasis from the Global instrument on challenges and opportunities.

It is recommended that environmental sustainability variables of the instrument be adapted in addressing sustainable development education and through benchmarking for instance from Istanbul, Bilgi in Turkey. However, further studies should be on the specific universities on the

progress made after application of the mainstreaming model towards environmental sustainability.

***Key words**: Environmental sustainability; global instrument; sustainable development; Kenya*.

How Many Vehicles are there on Kenya's Roads?

Prof. Madara Ogot and Prof. James Nyangaya

Department of Mechanical and Manufacturing Engineering, University of Nairobi, Kenya

Abstract

Just how many vehicles are there on Kenya's roads? There are currently no reasonable estimates as the data are no longer available ever since annual vehicle licensing was abolished in favour of fuel taxes. Yet, the need to have a reasonable estimate of current and future vehicle population trends is essential for the development and implementation of policies on planning of roads, reducing greenhouse gas emissions (GHG) from road transport, improving urban air-quality, reducing incidence of respiratory-related diseases, among others. Current estimates found in government documents range from 1.2 million vehicles in 2010 to 1.5 million vehicles in 2009. This study, therefore sought to develop a growth model informed by multiple sources of historical data to provide a reasonable estimate of current and future growth of motor vehicles on Kenyan roads. The methodology used new vehicle registration data from 1992 to 2014 to model the growth rate without retirement of vehicles in three broad categories: passenger vehicles, buses/mini-buses and trucks/lorries. Excluded were motor-cycles and three-wheel vehicles. National public service vehicle inspection data from 2013 and 2014 was then used to approximate the 'death' rate within each of the three vehicle categories. Incorporation of these parameters into the previous model yields a growth model with vehicle retirement. Retirement may be due to age, accidents, etc. From the growth model it was determined that Kenya has an estimated 702,000 – 773,000 vehicles on the roads in 2015, and are expected to grow to between 1,053,000 – 1,187,000 by 2022. These figures are lower, but significantly more accurate than the figures frequently used by government. The more accurate estimates from the model will enable policy makers to make better decisions as they develop and implement policy. It will also

provide more reliable estimates to other researchers whose work is based on vehicle populations. The approach and model developed is such that it can be updated each year with the latest data available.

***Key Words**: Vehicle population; GHG emissions; Kenya*

Gender Disparity in Cognitive Abilities: A Nutrition Perspective

Waswa J[1*], Ngugi L.W[1]. and Asiko L.A[1]

[1]Karatina University; Department of Food Science and Nutrition.

[2]Bukura Institute of Agriculture

Dr. Judith Waswa Matti; Email judiwaswa07@yahoo.com; 0719758589

Abstract

Gender disparity in academic achievement has been among the current issues in academic debates worldwide. Studies on gender disparity in academic achievement at different levels of learning have given contradicting results. A study by USAID revealed that female students perform better than their male counterparts at the lower grade levels as opposed to upper grade levels. Similar findings were revealed in a study in Ethiopia where male students were found to perform better than female students in upper levels. In Kenya, national examination results have revealed a significant disparity among the genders, always in favor of the males. Several hypotheses have been put across regarding the causes of the gender/sex differences. There was the debate on biological vs. social determinism. The biological perspective on sex differences and cognitive performance considers social factors to be trivial or subordinate to biological factors like brain structure. This paper seeks to give a nutritional perspective to the sex difference in cognitive performance. The paper reviews the importance of iron in improving cognitive function. Iron deficiency causes cognitive impairments that are related to attention span, intelligence, sensory perception as well as emotional and behavioral impairments. Adolescence in girls is a stage of increased iron requirement due to the physiological changes that accompany that stage. Iron deficiency among adolescents is a common phenomenon. This coupled with other factors contributes to a cognitive decline and therefore poor academic outcomes.

Preventing iron deficiency and anemia among adolescent girls may improve their academic performance and give them a favorable completion with the male counterparts. We This paper recommend.

***Key Words**: Gender disparity; cognitive functions; adolescence; iron deficiency.*

Advancement of Genetic Activities in Rwanda: Achievements, Challenges and Perspectives

Leon Mutesa, MD, PhD
Associate Professor
Center for Human Genetics, College of Medicine & Health Sciences,
University of Rwanda.
Email: lmutasa@gmail.com

Abstract

The creation of the Center for Human Genetics in Rwanda in 2006 was related to the increasing requests of genetic counseling and other services to the population including diagnostic and prevention. The objectives of this Center are to perform cytogenetic and molecular testings for diagnostic of genetic disorders; to conduct and promote research in all aspects of human genetics and genomics; and to serve as a center for higher education and specialized training in human genetics and allied disciplines. Under this broad mandate, the center pays attention to application of scientific and technical advances to the development and provision of diagnostic tests for genetic disorders commonly occuring in Rwanda, and train students and laboratory personnel. In addition, the center strives to bring together clinicians, geneticists and other specialists for translational research, provide a forum for discussion of the ethical and legal issues emanating from genetic research and routine work. Since the center started its activities, several various cases continue to be addressed and these mainly include patients with dysmorphic patterns and multiple congenital anomalies (MCA), global development delay (GDD), intellectual disability (ID), congenital heart defects (CHD), chromosome aberrations in spontaneous abortions and stillbirths, genetics of infertility and miscarriages, disorders of sex development (DSD), unsolved cases of metabolic diseases and other genetic defects like hemoglobinopathies. Cytogenetic

studies have been performed in the majority of these cases and the most common identified chromosomal abnormalities were Down syndrome, Edward's syndrome and Patau syndrome. A large spectrum of other chromosomal rearrangements including Turner syndrome, Klinefelter syndrome, Cat eye syndrome, DiGeorge syndrome, Williams syndrome, Angelman syndrome, Prader-Willi syndrome, 47,XX,+del(9)(q11), 46,XY,del(13)(q34) and 46,XX,der(22)t(10;22)(p10;p10)mat have been also identified. Most of complementary molecular tests including MLPA, a-CGH, and next generation sequencing (NGS) have been carried out in collaboration with the Center for Human Genetics of the University of Liege, Belgium, which continues to support our Center for capacity building and knowledge transfer. In conclusion, our current perspectives target to implement prenatal diagnosis considering the high frequency of chromosomal abnormalities in Rwandan population and also develop molecular analysis to allow further diagnosis of subtle chromosomal abnormalities and search for single gene mutations. In addition, a feasibility project on "newborn screening (NBS)" for metabolic and sickle cell diseases is under implementation in collaboration with different international partners.

***Key Words**: Genetic activities; genetic disorders; genetic counseling; cytogenetic and molecular testings; genetic disorders; human genetics and genomics; Rwanda*

Improving Early Diagnosis of Cervical Squamous Intraepithelial Lesions sing P16INK4a Marker on Cell Blocks from Cervical Smears

Martha Wakio Maina

Kenya Medical Research Institute, Pathology Department

Abstract

Globally, cervical cancer is the second most frequent cancer in women after breast cancer. Timely detection of premalignant lesions is a crucial component in reduction of associated morbidity and mortality. Pap test has been an effective screening tool though hampered by high inter- and intra-observer variability, false negatives at 20–30% and false positives at 5–70%.

Objectives of the study will be the determination of the role of $P16^{INK4a}$ biomarker in the identification of low grade squamous intraepithelial lesions in cell block prepared from pap smears. Raising the question on whether $P16^{INK4a}$ marker will minimize variability in reporting of intra-cervical lesions creating a standard devoid of subjectivity of reporting.This will be a laboratory-based study with a comparative arm. Patients with Pap results recommended for colposcopy will be recruited and consenting patients enrolled. Smears will be taken before colposcopy biopsy, a cell block prepared and immunocytochemistry run using the $P16^{INK4a}$ marker. Positive cell blocks will be reported and their corresponding colposcopy biopsies retrieved and $P16^{INK4a}$ marker run. This will compare the expression of $P16^{INK4a}$ on cellblock against colposcopy biopsy. Data will be entered into SPSS version 15.0 and inter-rater agreement between $P16^{INK4a}$ expressions in cellblocks with biopsy findings measured using the kappa coefficient, and reported using a bootstrapped, bias-corrected method

***Key Words**: Cervical cancer; cell block; colposcopy; immunocytochemistry; P16^{INK4a} biomarker*

Nitrogen-doped carbon nanotubes as supports for Pd catalysts applied in the selective hydrogenation of aminobenzophenone

Lucy M. Ombaka,* Patrick G. Ndungu and Vincent O. Nyamori
School of Chemistry
Dedan Kimathi University of Technology,
P.O. BOX 657-10100, Kenya
E-mail: lucyombaka@gmail.com

Abstract

Catalytic reactions uphold the principles of green chemistry by increasing the efficiency of producing chemicals in industries. It is therefore important to develop sustainable and selective catalytic systems that optimize the synthesis of industrial chemicals. To accomplish this, an efficient metal catalyst system with a high surface-to-volume ratio, a high degree of particle dispersion and good metal-support interactions, among other properties, is necessary [1]. Nitrogen-doped carbon nanotubes (N-CNTs) are carbonaceous materials exhibiting the afore-

mentioned properties, making them attractive materials for use as metal catalyst supports [2]. Pd catalysts supported on N-CNTs are postulated to show high catalytic activity in diverse reactions. In this study, we aimed at synthesizing N-CNTs and applying them as supports for Pd nanoparticle catalysts. Aligned nitrogen-doped carbon nanotubes (N-CNTs) were synthesized *via* chemical vapour deposition (CVD) technique by use of 3-ferrocenyl-2-(4-cyanophenyl) acrylonitrile as the catalyst. The compound 3-ferrocenyl-2-(4-cyanophenyl) acrylonitrile was synthesized by use of a solvent-free reaction and characterized by means of NMR, IR and MS spectroscopy. The obtained N-CNTs were characterized by use of transmission electron microscopy (TEM), scanning transmission electron microscopy (SEM), X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), thermogravimetric analysis (TGA) and Raman spectroscopy. The presence on nitrogen in CNTs was evaluated by XPS analysis, which depicted that the N- CNTs contained 2.5-4.5% nitrogen. The N-CNTs were purified *via* acid treatment and Pd nanoparticles were supported on them (Pd/N-CNTs). Scanning TEM (STEM) and regular TEM were used to visualize the Pd nanoparticles supported on N-CNTs (Fig. 1).

Figure 1. TEM image of Pd supported on N-CNTs; note the Pd is on the defect sites

Pd/N-CNTs was used as a catalyst to reduce nitrobenzophenone to aminobenzophenone. The observed chemoselectivity over Pd/N-CNTs was attributed to pyrrolic nitrogen functional groups present in N-CNTs [3].

Keywords: *catalysis, green chemistry, Pd, pyrrolic N-CNTs, hydrogenation reactions*

A Comparative Study on Efficacy of Bacteriophage and Clindamycin Against Multi-Drug Resistant Staphylococcus aureus

Joseph M. Ochieng' Oduor [1,2], Nyamongo Onkoba [1], Fredrick Maloba [3], Washington Ouma Arodi [2] and Atunga Nyachieo [1]

[1] Institute of Primate Research (IPR), Nairobi-Kenya; [2] School of Medicine, Kenyatta University, Nairobi- Kenya; [3]School of Applied Pure Science, Kenyatta University, Nairobi-Kenya.

* Corresponding author: josemislredo@gmail.com

Abstract

Hematogenous pneumonia caused by *Staphylococcus aureus* (*S. aureus*) is rare in communities, but its mortality and morbidity rates are high. *S. aureus* has been reported to exhibit antibiotic resistance. Therefore, an alternative therapy like the use of bacteriophage needs to be explored. The present study sought to compare efficacy of environmentally-obtained bacteriophage with clindamycin against hematogenous pneumonia caused by multi-drug resistant *S. aureus* (MDRSA) in mice. Bacteriophage and MDRSA isolates were obtained from sewage and waste water within Nairobi County, Kenya. Thirty BALB/c mice aged between 4 to 6 weeks were randomly assigned into three groups: MDRSA-infected group (n=20), phage-infected group (n=5) and non-infected group (n=5). After 72 hours post-infection (p.i.), the mice were either treated with a single dose of either Clindamycin (8mg/kg/bwt), 10^8 PFU/ml of phage or a combination of Clindamycin and phage. Data on safety of the bacteriophage was determined by observation of physical health and collection of blood, liver and lung tissues for histopathological studies and determination of viable bacterial counts. Efficacy was determined by comparing the levels of bacterial counts in blood and lung homogenates. The results showed that bacteriophage was efficacious (100%) compared to Clindamycin (87.5%) and combination treatment (90%). The mice treated with the bacteriophage did not show presence of viable bacteria at day 3 post-treatment and lung inflammation. A single dose of bacteriophage was efficacious against MDRSA compared to Clindamycin or combination of both. The study provides initial information on the use of environmentally available bacteriophage against emerging multi-drug resistant bacteria as an alternative therapeutic agent.

Key words: *Bacteriophage; Clindamycin; Staphylococcus aureus; multi-drug resistance; Kenya.*

The TGF-beta and TGF-beta Receptors in Endometriosis

Ezekiel Mecha[1,2], Charles O.A. Omwandho[2,3], Hans-Rudolf Tinneberg[1] and Lutz Konrad[1]

1 Department of Gynecology and Obstetrics, Justus-Liebig University, Giessen, Germany

2 Department of Biochemistry, University of Nairobi, Nairobi, Kenya

3 Kirinyaga University College, Kerugoya, Kenya

Abstract

Transforming growth factor-betas (TGF-βs) are elevated during menstruation and are suspected to be involved in the pathophysiology of endometriosis. TGF-β superfamily members are multi-functional regulators of cell fate. TGF-βs are highly expressed in the peritoneal fluid of patients with endometriosis, as well as in endometriotic sites. Thus, TGF-βs might be involved in biological processes leading to endometriosis. This study aimed to characterise the TGF-β receptors and their interraction with their ligands (TGF-β) in endometrial and endometriotic cells in vitro. Immortalized human endometrial stromal (T-HESC), epithelial (HES), endometriotic stromal (22B) and epithelial (12ZVK) cell lines were used. Cells were treated with or without TGF-β1 or TGF-β2, respectively, and the cell numbers were counted. TβRII/TβRIII and TβRI/TβRII interaction was analysed and quantified by in situ Proximity Ligation Assay . We showed that TGF-β1 or TGF-β2 significantly decreased cell numbers of all cell lines. Treatment of endometrial and endometriotic stromal and epithelial cells with TGF-β1 or TGF-β2 increased TβRII/TβRIII interaction. Of note, the interaction was stronger in TGF-β2-treated cells compared to TGF-β1-treated cells. Also, endometrial cells showed a stronger interaction compared to endometriotic cells. Finally, a moderate TβRI/TβRII interaction was observed in both TGF-β1-treated as well as in TGF-β2-treated endometrial cells. Overall our results showed that the TGF-βs exert a stronger influence in endometrial cells compared to endometriotic cells on the interaction of the high-affinity TGF-β receptors might explain the stronger reduction in cell numbers of endometrial cells. Remarkably, we could demonstrate a stronger interaction of TβRII/TβRIII upon treatment with TGF-β2 compared to TGF-β1 which underlines the importance of the TβRIII as a high-affinity receptor for TGF-β2. In summary, the different composition of the TGF-beta signalosome in endometrial cells compared to endometriotic cells suggest an involvement in the pathophysiology of endometriosis.

Assessment of Groundwater Salinity and Impact of Seawater Intrusion on a Coastal Aquifer – North Coast of Mombasa as the Case Study

*IDOWU Temitope Ezekiel [1], Nyadawa Maurice [2], K'Orowe M. Odondi [3]

Pan African University- Institute for Basic Sciences Technology & Innovation, Juja, Kiambu, Kenya

Jaramogi Oginga Odinga University of Science and Technology, Bondo, Kenya

Jomo Kenyatta University of Agriculture and Technology, Juja Main campus, Kiambu, Kenya

*Corresponding Author: lois.temitope@gmail.com

Abstract

Coastal areas all over the world are subject to several environmental challenges related to climate change and anthropogenic activities. Increasing rates of seawater intrusion into fresh water coastal aquifers is one out of the numerous identified challenges. Sea level rise as well as over abstraction of groundwater both play significant roles in increasing the ingress of seawater inland. The Coast of Mombasa is not immune to this phenomenon. This research aims to assess the extent of seawater intrusion and saline state of the groundwater in the North coast of Mombasa – the Kisauni Division. The study area is the most populated region in Mombasa County. The direction of population growth of the county is also northwards towards this region. Hence, the need to investigate the state of the groundwater vis a vis saltwater intrusion. Boreholes and wells were strategically identified within the study area and water samples were taken at the peak of dry season just before the long rains started. These samples were analysed in the field and in the laboratory for their pH, electrical conductivity, TDS, Cl, HCO_3, Ca, Mg, Na, K, and NaCl contents. The data were employed for estimating indices used to assess the states of salinity and seawater intrusion in the study area. Spatial maps drawn with the aid of GIS were used to describe the salinity concentrations and saltwater intrusion indices of the study area. It was observed that areas in proximity of the shore and creeks had the highest concentration of NaCl, EC and TDS values, which are strong indicators of the presence of saltwater intrusion. Other indices also reveal the presence of marine pollution and groundwater pollution from anthropogenic sources.

Keywords: *Coastal areas, GIS, saltwater intrusion, groundwater, pollution, Mombasa, Kenya.*

The African Catfish: Population Characterization in Selected Cultured and Wild Populations in Kenya

*Cynthia Nyunja, Joyce Maina, Joshua Amimo and Joseph Junga

University of Nairobi, Kenya

* Corresponding Author: cynyunja@yahoo.com

Abstract

Fisheries are an important source of nutrition and livelihood in Kenya. The African catfish (*Clarius gariepinus*) makes up a fifth of the total fish produced in the country. However, there are some challenges hindering potential actualization of catfish production in the aquaculture industry such as source of broodstock among others, which affect quality of fry. Species genetic structure is important in animal production. In order to characterize catfish broodstock, samples from four hatcheries distributed in the country were collected (Athi River, Kisii FPC, Jewlett, Sagana) and two wild populations. The samples were characterized using morphometric and genetic characteristics. In this study, canonical variate and principle component analysis were used to group the populations using documented diagnostic morphometric measurements of the African catfish. Morphometric clustering of fish was evident with some populations having an overlap, e. g., Sagana and Baringo. The mitochondrial DNA data will be used to verify population distinctiveness, source variations and introgressed populations in the hatcheries, and compared with wild populations. From the preliminary results, it is established that morphometric data can still be used as a method in preliminary characterization of the African catfish before proceeding with sequence variation analysis. The genetic and morphometric information from the study will give important sites for broodstock collection. The data will be used to inform management on important characteristics of broodstock and, by extension, improve fry quality hence production in the country.

Key words*: Catfish* ***Clarius gariepinus****; genetic diversity; morphometric; mitochondrial DNA.*

Processing and Consuming Edible Insects: Project Insefoods

Monica A. Ayieko
Jaramogi Oginga Odinga University of Science and Technology

Abstract

Consumers demand food items that appeal to their eyes before they ask about nutritional values. For this reason, almost all food manufacturers process food products that first must attract the attention of consumers and then must be affordable, all other factors remain the same. We are dealing with fairly educated consumers who do not just pick products off shelves in the supermarkets and use. When consumers normally pick new items, they are studied for few minutes before deciding to put it in the basket or to return it to the shelf. Edible insects are slowly but gradually taking root again and becoming acceptable alternative protein foods among different classes of people. Anthropo-entomophagy is still not fully accepted in many parts of the world. The question most people ask is whether entomophagy is safe or not. Others claim that it is the declining availability of land for production of conventional animals for protein food that is compelling human to turn to insects as food and feed. Nevertheless, entomophagy is safe and insects are easy to farm, cost effective, environmental friendly and healthy for human and livestock feeding. The objective of this presentation is to introduce why the World Bank supported project "Africa Centre of Excellence in Sustainable Use of Insects as Food and Feed" (INSEFOODS) at Jaramogi Oginga Odinga University of Science And Technology. The effort is to re-package and commercialize edible insects. The discussion will be centered on the projects objectives and how it intends to popularize edible insects as additional effort to improve food security and our strategy for implementation in the course of the next five years

Antimicrobial Susceptibility Profile and Conjugation Characteristics of Escherichia coli Strains Isolated from Broiler and Indigenous Chicken in Kericho County, Kenya

Mutsami AN[1]. Okemo PO[1] Cheruiyot RC[1], Kariuki S[2], Ogutu JO[3], Symekher SL[4]

Department of Plant and Microbial Science, Kenyatta University, P.O. Box 43844 – 00100, Nairobi, Kenya.
Kenya Medical Research Institute (KEMRI) – Centre for Microbiology Research (CMR). P.O. Box 43640 – 00100 Nairobi, Kenya.
Department of Pathology, Kenyatta University, P.O. Box 43844 – 00100, Nairobi, Kenya.
Kenya Medical Research Institute (KEMRI), Centre for Public Health Research (CPHR). P.O. Box 54840 – 00200 Nairobi, Kenya.

Abstract

Misuse and overuse of antibiotics is a leading contributor to emergence, selection and dissemination of drug resistance in human and veterinary medicine. *Escherichia coli* carrying resistance traits can be acquired through food chain and environmental routes. Antibiotic resistance and virulence genes can be shared during conjugation between bacteria. There are high chances chicken meat can be contaminated with resistant *E. coli* during processing. Man is likely to be infected by such *E. coli* by consuming contaminated chicken meat. The main objective of this study was to determine the antibiotic resistance profile of *E. coli* strains isolated from rectal swabs of chicken and to determine conjugation characteristics of strains exhibiting multiresistance. The study targeted broiler and indigenous chicken from randomly selected farms in Kericho County. A total of 710 fecal samples were collected, inoculated on Mac Conkey agar, and *E. coli* isolates confirmed by IMViC and lauryl tryptose mannitol broth biochemical testing. Inhibition zone sizes to a battery of 20 antibiotics were recorded and resistance profiles studied. Conjugation tests were done on multiple resistant isolates. Plasmids were extracted and run on agarose gel. Of 710 chicken sampled, 65.8 % (n=467; broilers, 34.7% and indigenous, 65.3%) were positive for *E. coli*. Overall, resistance was highest against penicillin (92.7%), tetracycline (68.1%) and ampicillin (66.8%). Plasmids containing genes for antibiotic resistance were transferable through conjugation. Plasmids of varying molecular weights (147 kb-3.0 kb) were common in MDR isolates. Resistance rates decreased with increase in bird age in broiler isolates, while in indigenous birds these rates increased with increase in age. Many isolates exhibited high resistance rates to antibiotics commonly used in chicken farming which are analogous to those used in human therapy. Such bacteria present resistance a pool that can disseminate to humans and other animals.

***Key words**: Human therapy, antibiotic resistance, conjugation, Escherichia coli, chicken, Kenya*

Zoonotic Malaria-Like Parasites in Baboons – A Human-Wildlife Interface Study

*Maloba Fredrick [1], Mwangi Danson K.[2], Kagira John[4], Kivai Stanslaus.[2], Ndere David [3], Ngotho J.Maina[6], Gicheru Michael[1], Mbaruk Suleiman[6] and Akinyi Mercy [2,5]

[1]Department of Zoological Sciences, Kenyatta University, Kenya

[2]Institute of Primate Research Box 24481, 00502 Karen, Nairobi, Kenya

[3]Kenya Wildlife Service P.O. Box 40241- 00100, Nairobi, Kenya

[4]Jommo Kenyatta University of Agriculture and Technology, P.O. Box 62,000 – 00200 Nairobi, Kenya

[5]Department of Biology, Duke University P.O. Box 90338 Durham, NC, 27708-0338 USA.

[6]Mount Kenya University P.O. Box 342 – 01000, Thika, Kenya.

*Corresponding author: Fredrick Maloba email: malobafred@gmail.com

Abstract

The increase in human population in Kenya has led to occupation of localities initially occupied by wildlife. This poses a challenge of human-wildlife interaction hence chances of zoonotic disease transmission. The current study assessed the prevalence of hemoparasite infections in olive baboons (*Papio anubis)* at the human–wildlife interface in Tsavo West National Park. Forty six baboons were trapped, anaesthetized and sampled for EDTA blood and ectoparasites then released back to the wild. Giemsa stained blood smears revealed *Babesia spp* (4.4%), *Entopolypoides* (4.4%) and *Hepatocystis kochi*(64.4%). PCR reported a higher prevalence of the parasites; *H. kochi* (87%), *Babesia microti* (10.8%) and*Entopolypoides macaci* (8.7%). *Ripicephalus* and *Hylaloma* ticks were found in the 28% of the baboons. All (100%) baboons had enlarged superficial lymph nodes. There was an association between *H. kochi* infection and lymph node enlargement (χ^2>3.84, P<0.05). Both *B. microti and E. macaci* are zoonotic and present with malaria-like signs in humans and they can also be confused with Plasmodium on blood smears hence pose challenges in their diagnosis. The presence of ticks in this locality shared by humans points to chances of transmission of these and other tick-

borne infections to humans. Zoonotic pathogens from baboons also include helminthes such as hookworms, gastrointestinal protozoa, bacteria such as tuberculosis and viruses such as Ebola most of which can be asymptomatic in the animals. There is need to put in place measures aimed at reducing the human-non-human primate interactions to limit zoonotic infections from baboons. Laboratory staff need to be trained on malaria-like zoonotic pathogens to avoid misdiagnosis since the treatment of the pathogens are different from *Plasmodium.* In addition, public health education on NHP zoonosis is vital for the public to know the risks they are exposed to when they interact with baboons.

Key words*: Zoonoses; baboon; hemoparasites; Plasmodium; Hepatocystis; Babesia.*

Performance of Chicken Fed on Black Soldier Fly Pupae Raised on Biodegradable Kitchen Waste

[1]Charles Adino Ng'ong'a and [2]Monica Awuor Ayieko

[1]Department of Agricultural Economics and Agribusiness Management,
Jaramogi Oginga Odinga University of Science and Technology.

[2]School of Agricultural and Food Sciences,
Jaramogi Oginga Odinga University of Science and Technology.

Email: mayieko@jooust.ac.ke; ngonga.charles30@gmail.com

Abstract

In most developing countries, poultry farming is among the fastest growing agribusiness enterprise. Nevertheless, costly, inadequate feed ingredients ostensibly remain a threat to many producers especially in Africa. This compromises sustainable poultry production across the continent. Since protein is the most expensive and scarce ingredient in the poultry feed, it is indispensable that a viable, high quality, less costly alternative feed ingredient be sought. The aim of this study therefore is to determine the performance of chicken fed on Black soldier fly pupae (*Hermetia illucens).* The study is conducted in the University's trial racks where the flies were attracted to lay their eggs on the fruits and vegetable waste from the kitchen. The eggs hatched and their larvae grew to prepupae which are self-harvested from the cages. The resultant

prepupae are solar-dried and milled into coarse sizes. Thereafter, the milled pupae were used to formulate a feed. The ratio is fed daily to fifteen chicken for ninety days. Besides, under similar conditions, commercial growers mash used as a control, was fed to another group of fifteen chicken for ninety days for comparison. The study adopted quantitative research strategy whereby experimental research design was used to investigate the effects of using insects as feed components on the growth rates of chicken. The chicken from both experimental and control groups were randomly sampled at weekly intervals. Each chick was weighed and the data statistically analyzed using Statistical Package for Social Sciences (SPSS) and regression analysis performed to compare their performance. The research is ongoing and shall be concluded in due course.

KeA Biorationale for Control of Vector Snails, Mosquitoes and Schistosome Larvae

Benter Atieno

Technical University of Kenya,

Department of Applied and Technical Biology,Faculty of Applied Science and Technology.

Supervisors: Prof. D.Yole (Technical University of Kenya); Dr. W. Lwande (ICIPE), and Dr. J. Nonoh (Kenyatta University)

Abstract

The frequent use of systemic insecticides to manage insect pests leads to a destabilization of the ecosystem and enhanced resistance to insecticides and pests, suggesting a clear need for alternatives. In addition, increasing documentation of negative environmental and health impact of synthetic insecticides, and increasingly stringent environmental regulation of pesticides, have resulted in renewed interest in the development and use of bio-insect management products for controlling mosquitoes, snails and other pests. Mosquitoes and fresh water snails are vectors of deadly diseases like Malaria and Schistosomiasis, respectively. Malaria kills 3 million people yearly in Africa while Schistosomiasis kills 500,000 yearly. Current control strategies against these vectors face drawbacks of drug resistance, cost and unavailability to those who most need them. Besides chemical pesticides used (e.g., DDT), organophosphates and organochlorines (mosquitoes) and Niclosamide (snails) are not environmentally friendly; they pollute the

environment and kill non-target organisms. Some larvicides like Bti. are imported, hence costly and require skilled personnel to administer. There is no vaccine developed to date against parasites of Malaria and Schistosomiasis, aggravating the problem further; hence, the need for cheap, safe and effective biorationale pesticides. The present study focuses on evaluating molluscicidal, miracicidal, cercaricidal and mosquito larvicidal activity of selected plant extracts with medicinal value. Plant materials will be collected and subjected to serial extraction using non-polar and polar solvents. Bioassays will be conducted both in the laboratory and simulated field condition. Results obtained from the toxicity studies of fractions and their combinations will be analyzed using dosage mortality Probit regression analyses of SPSS program (version 15) to determine their larvicidal efficacies (WHO, 2005 and Finnely, 1971) and plotted on Probit regression graph to obtain $\mathbf{LC_{10}}$, $\mathbf{LC_{50}}$ and $\mathbf{LC_{90}}$. Chi square values will be calculated by using the software developed by Ready *et al*., 1992. Results with $\mathbf{p< 0.05}$ will be considered statistically significant.

Key words*: Vector controls; snails; mosquitoes; schistosome larvae; malaria; drug resistance**y words**: Chicken feed; fly pupae (Hermetia illucens); biodegradable kitchen waste.*

The need for mainstreaming Sustainable Agriculture in African universities agricultural curricula

Vitalis Ogemah
Masinde Muliro University of Science and Technology, Kenya
Email: vogemah@mmust.ac.ke

Abstract

The importance of Sustainable Agriculture (SA) has been significantly elevated following its inclusion as a key target of the U.N.'s Sustainable Development Goal No. 2 (SDG 2) in addition to being aligned to contribute significantly to all the 17 SDGs. Yet the understanding and perception of the concept of SA is varied, confusing, conflicting and contrasting.

The promotion of SA that is envisaged in SDG 2 may not be attained especially in Africa unless there is widespread consensus over the understanding and application of the concept. The

problem with comprehension of this concept in Africa stems majorly from its exclusion from the formal curricula of agriculture, especially at undergraduate level. Considering that most of the drivers of agricultural extension, research and development in Africa are products of the formal agricultural trainings, it becomes very difficult to change their perceptions and attitudes towards SA once out of school. This omission has also contributed significantly to slowing down the impetus of research and knowledge creation on this subject with many of the important concepts such as sustainability metrics and voluntary sustainability standards not getting sufficient research attention from the African National Agricultural Research Systems. This paper reviews the understanding of the concept of SA, highlights the importance of SA to SDG 2, and draws a comparison between SA education in developed and African countries. The paper then discusses the need to change the approach to curriculum development for agricultural programmes with a view of mainstreaming the concept of SA in African universities. It is argued that this mainstreaming needs to be supported by adequate sensitization of agricultural trainers and managers as well as by policy review to integrate SA into the overall agricultural policies for African countries.

***Key words**: Curriculum; sustainable agriculture; sustainable development goals; sustainability; Kenya*

Malaria Vaccines in the Era of Malaria Eradication and SDG3.3

Thomas G. Egwang, PhD

Med Biotech Laboratories, Kampala, Uganda

Abstract

Malaria killed over 400,000 African infants in 2015. In Northern Uganda, a malaria epidemic raging since July 2015 has since killed over 600 people and afflicted over 1 million cases by January 2016. One year later, this epidemic has not yet abated. Current malaria control measures such as artemisinin-based combination therapies (ACTs), indoor residual spraying (IRS), and insecticide-treated bed nets (ITNs) have contributed significantly to rolling back malaria but are constrained by important shortcomings. IRS for example is expensive, donor-supported and

unsustainable. The epidemic in Northern Uganda occurred after only one year of stopping an IRS program. There is an urgent need for a malaria vaccine to complement these control measures. RTS, the only malaria vaccine candidate that has reached phase III clinical trials performed poorly in very young infants protecting only 31.3 % of infants 6-12 weeks old. Several subunit vaccines which have undergone phase I and II trials have also performed poorly when efficacy was assessed. Whole live attenuated sporozoite vaccines have stimulated a lot of excitement with efficacies exceeding 90 % in non-endemic volunteers but disappointingly low in endemic volunteers. The logistical constraints of deploying whole sporozoite vaccines in mass campaigns in resource-poor settings across Africa make it unlikely that they will make a significant impact. The target of the Sustainable Development Goal 3.3 is the end of the epidemics of malaria and other communicable diseases by 2030. The Malaria Vaccine Technology Roadmap 2013's goal is licensing by 2030 Plasmodium falciparum and Plasmodium vivax vaccines with a protective efficacy of at least 75 % against clinical malaria, the capability to reduce malaria transmission and eliminate malaria in multiple settings, and the vaccines should be suitable for administration in mass campaigns. The Malaria Eradication Agenda (malERA) shares the same goals of a high efficacy vaccine that can interrupt malaria transmission (VIMT). All the current vaccine candidates fall far short of these lofty objectives. None of the current vaccine candidates elicits long-lasting immunity so there might be an impractical need for frequent re-boosting in target populations. This is not realistic for poor public health systems already overburdened by other pressing health care issues like tuberculosis and HIV/AIDS. There is therefore an urgent need for a better understanding of what it takes to stimulate long lasting protective antimalarial immune responses. There is currently a new paradigm shift towards vaccine development that embraces multi-antigen and multi-stage vaccines that target both pre-erythrocytic (liver stage) and transmission blocking stages, and vaccine delivery platforms and adjuvants that induce long lasting immunity. This presentation will provide an overview of the current state of the art in malaria vaccine development and the quantum leap that is required to attain the stretch objectives and goals of SDG3.3 and the Malaria Vaccine Technology Roadmap.

***Key Words**: Malaria vaccines; sustainable development goals; malaria vaccine technology roadmap.*

Determination of Risk of Transfusion Transmitted Malaria Parasite among Blood Donations made at Kenyatta National Hospital, Blood Transfusion Unit.

TheresiaNdunda[1, 2]; Amos Mbugua[2];KibetShikuku[3,4] ;Naomi Waiganjo[1]

Abstract

The transmission of malaria through blood transfusion is one of the first recorded incidents of transfusion-transmitted infections (TTIs). Although the World Health Organization (WHO) recommends that blood for transfusion should be screened for TTIs, malaria screening is not performed in most malaria endemic countries in sub-Saharan Africa. The transfusion of infected red blood cells may lead to severe post-transfusion clinical manifestations of malaria, which could be rapidly fatal. Ensuring that blood supply in endemic countries is free from malaria is highly problematical, as more of the donors may potentially harbor malaria parasites. Within endemic settings, some pre-transfusion screening methods such as RTDs and microscopy have been identified as a cost-effective option for prevention of transfusion transmitted malaria (TTM).The objectives of this study will be to determine the prevalence of malaria parasite among blood donations, to determine the performance characteristics (specificity,positive and negative predictive values of the three malaria parasite screening techniques and lastly to determine the level of agreement of the three malaria parasite screening techniques.This will be an analytical cross sectional study involving three malaria screening techniques including a thick blood film, quantitative buffy coat (QBC) and rapid diagnostic test (RDT) using strip. The study data will be analyzed using Kappa statistic to express the level of agreement.

***Key words**: Malaria screening and transmission, blood transfusion,transfusion-transmitted infections; prevalence, performance characteristics*.

Geophysical Investigation of the Causes Of Borehole Failure in the Crystalline Basement Complex: A Case Study of Kaura Area of Kaduna State, Nigeria

Afuwai Gwazah Cyril

Department of Physics, Federal University Dutsin-ma, Katsina State, Nigeria.

cyafuwai@gmail.com

Abstract

Vertical Electrical Soundings (VES) using Schlumberger array were carried out at different points along five (5) profiles. This research investigates the causes of massive borehole failure at Kaura area of Kaduna state using the resistivity tomography techniques. Terrameter SAS300 is the instrument used to acquire the data. A total of 19 boreholes are functioning, while 31 boreholes are non-functioning within the area. The investigation has portrayed the possible factors which are most probably causative to borehole failures in the area, which involves the design and construction, groundwater potential/hydrogeological factors and operational and maintenance factors. It was found that it is possible for one factor to lead to another. For example, a borehole poorly designed, constructed and completed could result in sand/clay pumping and eventually affect the rubber seals in the hand pumps or the impellers in the case of submersible pumps. The boreholes tap the weathered and fractured basement aquifers of the area with yields ranging from 2 litre/min to 20 litre/min. However, yields from sandy soil aquifers were found to be extensive. The survey shows that boreholes with initial recorded yield less than 10 litre/min have failed over time. The survey reveals that the areas where wells and boreholes are drilled through sandy soil and fracture zones have sustainable aquifers for groundwater exploitation, while boreholes that are constructed through clay formation usually fail.

Keywords*: Resistivity; Kaura; borehole failure; Nigeria.*

Development by Fermentation and Utilization of a Safe and Stable Nitrosated Haemoglobin Pigment from Slaughterhouse Animal Blood

Joseph Mwaniki Wambui[1]*, Edward Gichohi Karuri[1] and Patrick Murigu Kamau Njage[12]

[1]Department of Food Science Nutrition and Technology, University of Nairobi, Kenya

[2]Division National Food Institute, Technical University of Denmark, Denmark

*email: mwanikem@yahoo.com

Abstract

An analysis of 13 major slaughterhouses supplying beef to Nairobi in 2005 indicated that 132,702 herds of cattle were slaughtered. Assuming that each cow produces 15 litres of blood upon slaughter, then, approximately 1.99 million litres of blood are produced in this region. Only a few slaughterhouses utilize blood from their slaughter operations to make biogas. The rest finds its way into drainage systems and eventually into rivers as a pollutant. Blood is therefore, a problematic by-product of our meat industry. The biological oxygen demand (BOD) of blood is 6.5 times higher than organic wastewater. It is therefore evident that the meat industry continues to harm the environment in more than one way. Already, intensive production of animals has been implicated for climate change. To promote sound slaughter operations that are environmentally friendly, suitable methods of utilizing blood must be found. While utilization of blood to make biogas is one promising method, it has been observed to promote poor unhygienic practices, especially in the small slaughterhouses. Soap use is discouraged among the meat handlers to prevent inhibition of microorganisms responsible for fermentation. This raises the food safety risk associated with consuming contaminated meat. This study aims at developing stable nitrosated haemoglobin pigment from slaughterhouse animal blood by a fermentation process. The developed pigment will provide an alternative to synthetic red food colorants that are used in the meat industry, thus creating an opportunity for the Kenya's meat industry to not only utilize their by-products but also present consumers with safe products that do not expose them to carcinogens. Also, the separation of the blood components into cellular fraction and plasma fraction will create further avenues for processing the locally generated blood into other value- added product such as binders, emulsifiers, fat replacers, nitrite-free curing agents, egg-replacers in baked goods, protein supplements, iron supplements, bioactive compounds etc. Successful development of this pigment will further open new research for hygienic collection of

blood during slaughter, thus improving slaughter operation especially in the small abattoirs. Hygienically collected blood will be fermented using lactic acid bacteria. The optimum fermentation conditions will be determined using surface response methodology. The pigment will be extracted through exhaustive extraction process. Physical, chemical and biochemical properties of the pigment will be determined. Bioactive compounds from the pigment will also be determined. Physical, chemical and biochemical properties of sausage prepared with the pigment will also be determined.

***Key Words**: Haemoglobin pigment; fermentation; slaughter houses; animal blood; Kenya*

Maxent Modeling for Predicting Suitable Habitat for a Threatened Medicinal Plant Species,Strychnoshenningsii in Kenya

Kuria M.W[1*]. , Ngumi V.W[2]., Njenga P.K[2]. and Wangai L N[3].
Kabarak University
Jomo Kenyatta University of Agriculture and Technology
Kirinyaga University College
*Corresponding author email address: marykuria2012@gmail.com

Abstract

The use of species distribution models has gained popularity in biological sciences. These tools find use in predicting species distribution across a given area of study. The maximum entropy or "maxent" distribution model was used for predicting potential suitable habitat for *Strychnoshenningsii. S. henningsii* is a threatened and endangered medicinal plant species in Kenya. It is highly over exploited for medicinal purposes, which has resulted in its decline in the natural habitat. For instance, it has been reported as disappearing in Ukambani areas in Kenya. A study on ethnobotany of this species reported that the species was obtained with difficulties in the study areas. Recently, Neem Foundation in Kenya reported that this species is important for malaria treatment. Therefore the species is a serious case for conservation. In order to model the distribution of *S. henningsii* , field collected co-ordinates of 270 presence locations of this species were used. Additionally, environmental data downloaded from the wordclim data portal were also used. Maxent was then run using default settings with 75% of the locations being used

for the training and the remaining 25% for the testing of the model. MaxEnt generated the predicted suitability of a habitat of a species on the scale from 0 and 1. Lowest suitability areas are represented by 0 and 1 represented the high suitability areas. The results indicated that the area under the curve (AUC) for the Receiver Operator analyses measured at all possible threshold values for training (0.986) and test (0.983). These values were close to 1 thereby showing the accuracy of the model in prediction. The areas identified for growth and reintroduction of these species were Kilifi, Kwale, TaitaTaveta, areas around Mt. Kilimanjaro Game Reserve, Maasai Mara game reserve, Marigat, Maralal, Baragoi, Marsabit and Huri hills (dryland areas in Kenya). These areas can be used to develop *S. henningsii*demonstration plots. People living within these niches can also be encouraged to adopt the taxonomic category for agroforestry.

Key words: *Maxent; species distribution models; threatened species; Strychnoshenningsii; conservation*

Biofuel Synthesis from Waste Cellulosic Biomass Using Indigenous Salt Hydrolytic Catalytic Regimes. An Indigenous-Modern Technology Infusion.

Dr. Aloys Mosima Osano1*; Prof. Eric R. Okong'o2; Prof. Oyaro Nathan1; Dr. Jackson Kiptoo2

1- Maasai Mara University,

P.O. Box 861-20500,

Narok, Kenya

2- Jomo Kenyatta University of Agriculture and Technology,

Juja, Kenya

Corresponding Author: Dr. Aloys Mosima Osano1*; Email: aloysosano@mmarau.ac.ke

Abstract

Cellulosic biomass waste is plentiful and a menace to the environment. Breakdown of cellulose to fermentable simple sugars for yeast ethanol green fuel production at; water boil-off temperatures, atmospheric pressure and contaminant free has been a challenge. Several African communities used selected indigenous salts to soften foods and shorten the cooking period at ambient conditions. This research emphasizes on hydrolysis of cellulosic biomass using

Indigenous mineral salt catalysts to contaminant free fermentable sugars at ambient conditions. Studies of indigenous mineral salt hydrolysis of two non-woody agricultural lignocelluloses; wheat straw and gallants soldier was determined. Indigenous salts; 'magadi', 'Lebek' and 'Ebara,' catalysts were sampled and investigated. Salt compositional analysis of; metallic ions, pH values, %CO32-, %HCO3- and percentage hydrolysis were studied. Analytical instruments used; AAS, Flame Photometer, XRF, FTIR, UFLC, and a Ph meter. The salts recorded alkaline pH of ≥ 9.98 and the FTIR analysis recorded a HCO3- group presence. Carbonate levels were highest in magadi (47.2%wt/wt), and least in Lebek (11.8% wt/wt). Metallic composition: magadi had Na+ (71.52 mg/g), para had Ca2+ (52.56 mg/g), while Lebek had Ca2+ (166.09 mg/g) as main elements. Lignocellulose-neat salts hydrolysis recorded least values in 'Lebek' (20.94±0.01%), and highest being in magadi (44.99±0.03%). This correlated well with the %HCO3- amounts, where higher bicarbonate levels showed higher percentage of hydrolysis and vice versa. Para salt was a better ligno-cellulosic hydrolyser in oxidative media than the other salts tested. Wheat straw-para salt hydrolysis recorded total sugars of 30.12% wt/wt on average and an ethanol amounts of 64.07% vol/wt. Gallants soldier para salt recorded slightly lower amounts, with sugars of 18.09%wt/wt and ethanol of 49.74%vol./wt. Indigenous African-Foreign technology infusion could be the key to engineering science and technology research in Africa.

Key Words: *Ligno-celluloses, Biomass, Indigenous salt, Hydrolysis catalysts, ambient conditions, Fermentable sugars, Biofuel, Ethanol*

Oil Prices and the Real Exchange Rate: Empirical Evidence from South Korea and Kenya

Diana Kayeke Lukalo

Abstract

The exchange rate is an important macroeconomic variable that affects the level of investment, balance of payments and price stability of a country. In international finance, the elusive connection between exchange rates and economic fundamentals that determine it has been labelled very controversial warranting academicians to attempt to solve the various riddles associated with it. This paper examines the empirical relationship between the real exchange rate and real oil prices. It explores whether real oil prices have a reliable out-of-sample relationship

with the Korean won/United States dollar and Kenyan shilling/United States dollar real exchange rates using monthly data spanning the period of 1995– 2015. In particular, the main objective is to know how well real oil prices (on its own without other determinants) can predict the real exchange rates out-of-sample for the two countries compared to the random walk benchmarks. The study adopts an error correction model (ECM) renowned for its ability to capture the short-run and long-run dynamics in a unified system. The empirical findings propose that the out-of-sample predictive ability is strong and robust across short-run horizons for South Korea and the long horizon for Kenya. The mere verity that both countries are net oil importers is evinced by the positive predictive coefficient obtained after analysis. However, the underlying country differences in terms of the exchange rate regimes adopted and the level of economic development (production and consumption, with South Korea being a large manufactured goods exporter and fully incorporated in the global market while Kenya a more agrarian exporter and not globally integrated) emerge in the out-of-sample forecast. Generally, the oil price predictors for both countries outperform the random walk. These results imply that adding oil prices to the other set of exchange rate determinants (such as monetary models) may help improve their forecasting ability.

Quality of Hypertensive Healthcare Services Among Patients Attending Level Five Public Hospitals in Nairobi County, Kenya

Mwarimu Alfred
Kenyatta University
lfrdmwrm1@gmail.com

Abstract

Quality of health care services is such an important component of health care that patients usually base on it when deciding where to access the health care services. In some cases, patients will even go to unimaginable limits in order to cash in on the quality of a particular health care provider. The quality of the public health care sector in Kenya has rated poorly, yet the majority of patients with chronic conditions receive their care from these. Therefore, this will be a two phase descriptive cross sectional study that will assess the quality of hypertension health care services being offered in level five hospitals in Nairobi County. Phase one will use a 21-question

standard to assess the level of patients satisfaction and also the existing quality gaps in these hospitals. The second phase will utilize key informant interviews, observation checklist, and desktop review of the past medical records to assess the quality of the structures, the processes, and the various health outcomes from the various hypertensive healthcare services being offered in level five hospitals. The study will also identify the various approaches employed to enhance the quality of hypertensive health care services in the level five public hospitals in Nairobi County. Five Hospitals, selected purposively, will be proportionately allocated an appropriate sample of respondents who will be randomly selected at the exit point. The quantitative and qualitative data collected will be analyzed using SPSS version 21 and ENVIVO version 11 for data, respectively. The χ^2 square test will be used to test for any relationship between the variables and two way ANOVA will be used to test for any variation in the quality of health care services between the five public hospitals and the results will be presented in the form of tables and figures in Nairobi County. The study will identify the existing quality gaps in level five hospitals and provide a baseline for improving the quality of hypertensive health care in public level five hospitals. The study will also identify the best practices being used in the public hospitals with the aim of sharing this information for quality improvement.

***Key Words**: Hypertensive healthcare; level five public hospitals; Nairobi County; Kenya.*

Peace Education Curriculum for Sustainable Community Development in Kenya

Susan Wasike[1] and Thomas Amukaya Andabwa[2]

[1] Msc Student at MMUST, Kenya: swasike@mmust.ac.ke

[2] PHD Student at Moi, University: andabwathomas@gmail.com

Abstract

In recent time, humanity has been hampered by many challenges like war and racism which have increased recognition of peace education by educational and policy authorities, and a substantial addition in the number of publications in peace education around the globe. In Africa, realization of behavior change towards non-violent conflict resolution, social justice and democratization is

increasing in countries like Burundi, Egypt, Rwanda and Kenya though not much has been done because the education system is hampered by many challenges like inconsistent peace curricula, lack of people's will, human and financial capacity of peace educators to enhance peace education for a sustainable society. Some countries like Tanzania ignore it on the assumption that they have never been to war before and not any soon will they be at war.Considering the growing need for knowledge within peace education, the paper explored the status and perception of communities on peace education, approaches adopted in peace education and its significance on community development and finally cited the challenges encountered in their implementation. The paper used the knowledge-based subject approach, skills and attitudes approach, combining knowledge, skills, and attitudes approach, and theory of change approach. These approaches can take place within schools, outside schools or involve the communication by other channels in order to reach children, youths and adults who may not be served by the trainings and workshop programs in schools or out-of-school. The type of world that we create in the future depends on our ability to reject violent and militaristic approaches to solving problems in order for peace education to improve human relations in families, schools, at the workplace, within countries and across borders. Peace education is limited by conflicting collective narratives, conflicting historical memories, grave inequalities and political challenges. The paper informs policy makers and educators for the need of involvement of local youths in peace initiatives that in-turn result into sustainable community development and full participation of women in peace education programs since women are the worst hit in conflict situations. It recommended that since peace education is always within us, then, we should increasingly use the available approaches in either formal or informal settings so as to promote peace education at all levels of the society. This is the fact that development of our community greatly depends on existence of sustainable peace so as to achieve sustainable social, economic, environmental, cultural and political development.

Keywords: *Peace education; curriculum; peace perceptions; sustainable society; Kenya.*

Scaling up training in forestry and environmental courses in Kenya: Reflection onChallenges and Opportunities in newly established Universities. A case of Kabianga

Joseph Hitimana[1*], Eric K. Koech[1], Peter K. Sirmah[1], Zablone O. Owiti[1], Musa G. Apundo[1], Anne Sitienei[1], and A. Wachiye[1]

[1]School of Natural Resource and Environmental Management,

University of Kabianga,

P.O Box 2030 – 20200, Kericho

*Corresponding author: josephhitimana@kabianga.ac.ke; hitimanajh@yahoo.com, deansnrem@kabianga.ac.ke, +254 712 313 838

Abstract

The period 2011-2012 observed expanded University education in Kenya. Environment and forestry are such universally well known pillars of sustainable development and social well being of citizenry. Some newly established universities foresaw the need to strengthen this pillar by strategically launching curricula and training in forestry, agro forestry and other environmental courses. The main purpose of this study was to form an opinion and derive areas of improvement and recommendations, which aim to contribute to streamlining forestry and environmental education, research and training and address emerging forestry issues and challenges of the 21st century. Data were collected from University of Kabianga between 2011/2012 and 2015/2016. Published data from University of Eldoret (UoE), South Eastern Kenya University (SEKU) and Karatina University were used for comparison purposes, whereby statistics on students admissions and enrolment from academic years between 2004/2005 and 2014/2015 were used to cover periods before and after expansion of universities. This paper highlights experiences in the existing scenario in sampled institutions and proposes interventions that could enhance rates of enrolment and sustain high quality training in forestry and environmental courses in young universities. The study revealed a positive strong correlation between increasing the number of universities on the levels of students' admissions and rate of enrolment in Kenya. Diversification of programmes within any given university also indicated positive effect on levels of students' admissions and enrolment rates. However, high rates of late reporting and deferment of courses hint at university education challenges to be addressed. Kenyan Universities also face challenges in staffing, capacity for staff development, inadequate facilities, specialized field laboratories and

internship opportunities. In short and midterm, promotion of digital learning platform such as video conferencing would enhance sharing of scarce academic staff, while purposive increased scholarships and ex-Chequer facilitation to support mobility to the field and develop field facilities for selected specialisations would motivate the society and enhance relevant quality education.

***Key words**: communication system, digital learning, enrolment, professionalism, scholarships, field laboratories*

The Global Sex Trafficking of Women & Children: A Public Health Challenge

Morris Komakech and Tanzina Islam

Dalla Lana School of Public Health, University of Toronto, Canada

Abstract

This paper examines the discourse of global human trafficking for sexual exploitation, a practice that is now rampant with transnational transactions. Human trafficking, whether for forced labor or sexual exploitation is a criminal activity with nearly 21 million victims globally. It is the second largest most profitable industry in the world after drug trafficking, raking in US$ 150billion annually, out of which, US$ 99 billion of this amount accounts for sex trafficking alone (International Labor Organization [ILO], 2016). This literature review research study focuses on the plight of an estimated 4.5 million women and children who are currently in circulation, being trafficked and forced into involuntary sexual exploitation. The presentation will highlight how victims of sexual exploitation suffer physical, emotional and psychological health issues due to: enforced cohabitation, sexual exploitation, exposure to violence, denial of healthcare resources and psychological trauma associated with rape and dehumanization throughout the trafficked experience, leading to a host of public health concerns. A social-ecological framework of analysis will be applied to examine the multilayered factors associated with vulnerability to being trafficked, and the public health implications that result from global sex trafficking overall. The few existing solutions and frameworks put in place by various organizations to counter this problem will be analyzed for applicability and effectiveness. The

paper will conclude with recommendations to strengthen international and local actions to monitor, report, and prevent the harnessing of vulnerable women and children for sex trafficking.

Keywords: *Human trafficking; sex trafficking; socio-ecology; vulnerability; public health; organized crime.*

Engaging Religious Leaders in Environment Conservation

Wilson Hassan Nandwa

Umma University, Kenya

Abstract

In the distant past, plants and animals available in the ecosystem provided the solution to human demand for food without fear of scarcity because the early human beings numbered were very few and the resources were abundant. Although abundance could have been an incentive to mismanage the resources to the detriment of the future generations, fortunately, our ancestors managed to use them according to their needs without destroying those they did not need. There must have been a mechanism employed by ancient communities to deter people from destroying the environment and encourage them to use the available resources in a sustainable manner. To evidence this mechanism, we need to dig deep into African cultural practices and beliefs.

The research questions posed are:

1. What deterred the ancient African communities from environmental mismanagement?
2. Is awareness creation of harmful effects adequate to encourage environmental conservation?
3. Are legal sanctions sufficient to deter modern African communities from environmental destruction?

This Paper presumed that "the effective approach for environmental conservation is to invoke the community beliefs in the Supreme Powers." This is a descriptive research that employed questionnaire tools distributed to residents of Busia County, Kenya, through random sampling. Although 100 questionnaires were, only 90 were collected of which 30 were from responders aged above 60 years, and 80 professed to be of the Christian faith whereas 10 were Muslims. Of

the total responders, 70% indicated they would abstain from African taboos or religious prohibitions, whereas 90% stated that they may do something knowing that it is harmful if the effects are not immediate. Moreover, 80% of the respondents indicated weak Government presence to monitor conservation of the environment in the villages. We conclude that African communities are more willing to conserve the environment on the basis of "taboo or religious prohibition" than the fear of legal consequences or awareness of the harmful effects.

M-Shwari Credit Scoring: Peer Group Borrowers versus Individual Borrowers

Davis Bundi Ntwiga

School of Mathematics, University of Nairobi, Nairobi, Kenya

Email: dntwiga@gmail.com

Abstract

The mobile-based micro-credit facility, M-Shwari ("Shwari" means clam in Swahili), was started in the year 2012 by Safaricom Kenya (a telecommunication company) and Commercial Bank of Africa (a Central Bank registered commercial bank in Kenya). This facility has eased access to credit facilities for Kenyans. However, the low income earners have limited ability to access credit facilities in Kenya as they lack good financial options. Their income is volatile, fluctuating daily and they lack reliable ways to harness the power of their low income. M-Shwari is a mobile- based platform that can capture the low deposits and withdrawal activities of these types of customers. This paper proposes a decision support system for credit scoring of the low income earners who are customers of M-Shwari using the hidden Markov model. The data is generated through simulation using the uniform distribution. A comparison is made between lending to the peer group customers and individual customers in terms of their credit scores and credit quality levels. The customers' socio-demographics, their telecommunication characteristics and the account activities comprised of deposits and withdrawals are used to estimate the credit scoring factors. The learning and training of the hidden Markov model is based on these credit scoring factors. The model emits the credit scores and the credit quality levels of the customers, both for the peer group customers and the individual customers. The peer groups were found to have high levels of consistency and strong linear relationship in terms of credit scores and credit quality levels during different time periods. Therefore, the peer group borrowers for the low income

earners are more attractive to offer credit facilities using M-Shwari as compared to the individual borrowers.

***Key Words**: Credit facilities; decision support system; credit scoring; peer group borrowers; individual borrowers; Markov model.*

Assessment of the Technical Efficiency of smallholder Coffee Farming Enterprises in Muranga, Kenya

Victor Kamau, Josiah Ateka[1]* and Robert Mbeche
Department of Agricultural and Resource Economics
Jomo Kenyatta University of Agriculture and Technology
P.O Box 62000 -00200,
Nairobi, Kenya

Abstract

Coffee is a major contributor to Kenya's foreign currency earnings, coming third after tourism and tea. An estimated six million Kenyans are directly or indirectly employed in coffee production, processing and marketing. However, production of coffee has declined significantly over the past decades, resulting in increased poverty in coffee-dependent communities. Using survey data of a randomly selected sample of 78 smallholder farmers in Murang'a County in Kenya, this paper used the Non-Parametric Data Envelopment Analysis (DEA) approach to estimate their technical efficiency. Results showed that the average technical efficiency was low at 54%. The findings show that the coffee variety, access to credit, the farmers' experience and farm size are critical determinants of technical efficiency among smallholder coffee farmers. The paper provides innovative arrangements that should be enhanced to increase farmers' capacity to efficiently use the available resources in coffee production.

Keywords: Coffee Production, Technical Efficiency, Non-Parametric, DEA

The Condition of Schools' Infrastructures and Its Effects on Quality Learning Outcomes in Primary Schools in Kenya.

Dr. Josphat Kagema

,Karatina University

Abstract

The role of school infrastructure in attaining quality learning outcomes is paramount in achieving the education goals. Some of the infrastructures across the schools are aging and dilapidated therefore becoming a barrier to optimal learning, teaching and prompting increased costs of maintenance which results in escalating school infrastructure costs. This is despite the Kenyan Government efforts of pumping huge resources in the provision of free basic education to ensure on equitable access of education. Poor school facilities have negative consequences for the students' learning environment hence improving the school's environmental conditions improves student achievements by reducing distractions and enhancing a conducive environment. Evidences from Kenya reveal glaring disparities among schools on the provision of education with respect to school infrastructures such as modern classrooms, well equipped libraries, multimedia tools, computer laboratories, workshops, sanitation facilities and general school outlook. This study therefore uses evidences gathered from a survey of 44 primary schools distributed across two counties of Kenya selected using random-stratified sampling method. Rural primary schools were compared with urban primary schools and a statistically significant difference was found at $p<0.05$. A structural model was designed and tested on school covariance matrix and a chi-square test of independence. Results suggest that school resources are unequally distributed within counties and in schools of different categories based on multiple regression variables. There was marked significant differences in learning outcomes among learners in the different schools based on the availability of the learning quality infrastructures. The study recommends an urgent need to improve the status of school infrastructures in all schools as they have a huge impact on learning outcomes.

***Key Words**: School Infrastructure; Quality; Learning Outcomes; Free Primary Education*

Analysis of Environmental Sustainability Performance Contracting Targets and Development of Environmental Sustainability Indicators for Universities in Kenya

Prof. David N. Mungai, PhD
Deputy Director: Wangari Maathai Institute for Peace and Environmental Studies
College of Agriculture and Veterinary Sciences
P.O. Box 30197 Nairobi.
Email: mungaidavid@uonbi.ac.ke

Abstract

Environmental Sustainability Performance Contract (PC) targets were introduced in the 2012/13 financial year as part of the broader public sector reforms and a strategy for performance improvement in the public service that includes Kenyan public universities. However no evaluation has been conducted to assess performance improvement and impact. The objectives of this study were to (a) conduct a review and brief analysis of the PC targets reporting by universities, (b) assess the authenticity of reporting, (c) establish key challenges in mainstreaming environmental sustainability recommendations, (d) develop an indicative list of environmental sustainability indicators and, (e) compile resources to guide the universities during implementation of environmental sustainability activities and reporting. Data and information were obtained from quarterly reports submitted to the National Environment Management Authority (NEMA) for the 2012/15 period. Proposed indicators were developed from the NEMA guidelines, published sources and online "best practices". The prescribed indicators did not meet the criteria of an optimal indicator set. Reporting trends revealed that not all universities submitted quarterly reports. The choice of targets was variable, with most universities opting for "soft targets". The Vice-Chancellors signed the quarterly reports, confirming authenticity and process ownership. There was no evidence of progressive improvements. Intervention impacts could not be ascertained due to lack of baselines. The key

challenges encountered included lack of baseline data and clear implementation strategies, ineffective environmental sustainability committees, inadequate resource allocation for prescribed activities and lack of information and guidelines. This paper proposes indicators and indicative measurable variables. The paper further provides useful resources to assist in the implementation of the PC targets. Regarding the Global Action Program recommendations, the paper proposes three areas for implementation. We also recommend expansion of the scope of the environmental sustainability PC targets to address the post-2015 global sustainability agenda by aligning them with the Sustainable Development Goals.

Key words: *performance contracting, campus sustainability, sustainability targets, sustainability indicators, sustainable development*

Student Engagement in Environmental Sustainability, a Keynote presentation at the Status Conference on Higher Education to be held from 22nd to 26th August 2016 at Kenyatta University

Abstract

Learning in tertiary institutions can enact personal and societal transformations to sustainability. The Global Action Programme (GAP) on Education for Sustainable Development (ESD) prioritizes the role of the youth in achieving Sustainable Development Agenda. It sets out the agenda for empowering youth with information on the impacts of their daily choices and actions, while tapping into their creativity and determination to find innovative solutions and alternatives.

As key stakeholders of the higher education academy students should be engaged as partners in the higher education's transformation agenda. They should be invested with the power to co-create, not just knowledge or learning, but the higher education institution itself. Unfortunately, many academic and policy discourse on transforming university education often neglects the issue of student engagement. In the few instances where it is addressed, discussions are often focused on student satisfaction with little opportunity for the students to reflect upon, or report on the quality of their learning or their role within it. These reinforce the view of 'students as consumers' rather than 'partners in a learning community'. Thus, the incorporation of this keynote address in this conference is a shift from the norm. It will challenge the conference

participants to reflect on student engagement as a prerequisite for the envisaged revolution of the quality of the higher education.

This presentation reviews the landscape of students' engagement in Kenya's Higher Education's greening agenda. It delves into the motivation and rationale for student engagements. Further, it highlights how student engagement in environmental sustainability is (or is not) described in institutional policies and strategies, relationships between students and staff, actual student activities, on and off campus. It also proposes actions that would enable a whole-institution and systemic approach to student engagement in greening Kenyan Universities.

Green Campus in Kenya

By Dr. Dorcas Beryl Otieno, OGW
Executive Director Kenya organization for Environmental Education

Abstract

With core missions of research, innovation, education, organisational processes and excellence, universities bear a responsibility for visioning and realising a more sustainable future as they educate the future leaders of our society and economy. By treating the campus as a laboratory for exploring the concepts of sustainability an institution can model sustainability to the wider community. In order to achieve sustainable development in a changing climate, the Kenya Green Economy Strategy and Implementation Plan-GESIP (2015) has prioritized sustainable infrastructure, building resilience, sustainable natural resource management, resource efficiency and social inclusion, mainstreaming green economy initiative in development plans, good governance that creates a conducive environment for green initiatives and participation of all stakeholders, including partnerships with other stakeholders . To this end, universities need to develop programmes that foster applied research and education by using their campuses to test real-time sustainability solutions. Nevertheless, universities face several challenges including insufficient training of personnel, high cost of construction of green buildings high cost of investment and maintenance, lack of policies, poor planning and prioritization, lack of support from top management amongst others. Sustainability leadership is key for Greening campuses-

creating a shared vision, inspiring positive change, building capacity, empowering others, leading by example, facilitating change and harnessing innovation and creativity to foster a culture of sustainability within and beyond the campus.

Curriculum Change: The Fluidity of Knowledge and Technology.

Prof. Edward K. Tanui: Email: edtanui@gmail.com
and
Dr. Jepkemboi R. Choge. Email: jepkemboichoge@gmail.com
School of Education
Maasai Mara University
P. O. Box 861- 20500, Narok

Contact email: edtanui@gmail.com

Abstract

The 21st century is witnessing the largest period of substantial change in education. The new information age is challenging the future existence of schooling in secondary schools and the universities. Technology affects the way of thinking of both the teacher and the student. It is also challenging how the teacher works as the physical classroom is no longer an important facet in learning. The time table may not be defined as it was in the 20th century. The curriculum is being influenced by technology as learning can take place 24 hours a day, 7 days a week and anywhere. Web site education is slowly taking over the school. The Multi-media integration of concepts, facts, images, data and sound is creating meaning in complex ways in the learner. The challenge is enormous as there are over 550 million websites and billions of searches of information. This assumes that instruction will not be deficient in subject content. The challenge is whether all this will lead to achieving the old time educational objectives written in syllabi of various educational institutions. It is also whether what we teach today will be valid tomorrow, because knowledge is doubling every hour and whatever secondary school or college students learn in the four years will still be beneficial or applicable. This is because knowledge and

technology are fluid as observed. Therefore this means there will be need for "unlearning" thereafter because the world outside university will have changed.

***Keywords**: Curriculum, Change, Fluidity, Knowledge, Technology*

Towards translation of Universities into National Data Archives for research and economic development.

By Dr Peter A. M. Mwaura

Chairman of Educational Psychology in Kenyatta University.

Abstract

An essential component of any decision making in development planning, implementation and impact evaluation is data. Without data, a country's efforts to plan for future growth and welfare of its people cannot be grounded in reality and therefore may be severely flawed. Data is a tool of accountability and helps drive the very outcomes that it is meant to measure. Valid, reliable, timely, comparable and available data on social, demographic, economic and environmental conditions of a nationis an indispensable tool for national development, growth and planning. A government without viable infrastructure for information generation, dissemination and usage is severely handicapped in doing proper planning, monitoring and evaluation of development programs and projects and also in arriving at good decision with respect to government policy formation. The devolved system of governance in Kenya has created a demand for data to enable planning and implementation. Without quality data and access to it the country's counties cannot plan or budget. Universities are well positioned to support the acquisition, processing, analysis of data and the subsequent dissemination to the counties for decision making and action. This requires the development of appropriate infrastructure that will ensure continuous flow and processing of data from the counties, sharing of information. Such a digitized infrastructure will also be a resource of research data at a wider context geographically, sector-wise and variable-wise. This paper makes a proposal onto the creation of archival infrastructure in the universities aimed at enhancing broad-based research for county's planning, implementation and decision making.

Role of Research Information Management Systems (RIMS) on Promoting Science & Technology in Research Institutes of Kenya

[1]Riany Kenneth Goga, [1]Kivati Chris Benard and [2]Abaki Zipporah Adhiambo
[1]Kenya Forestry Research Institute,
[2]Constitutional and Reforms Education Consortium
Nairobi, Kenya
[1]Corresponding Author: rianyken@yahoo.com

Abstract

Despite research being singled out as the driving force and the government laying a lot of emphasis by supporting various projects being undertaken by research institutes, research productivity and innovation has continued to decline with each passing day. Challenges leading to this dismal show have not been adequately investigated and well understood, hence hindering productivity of the institutions playing a fundamental role in developing differentiated and effective systems, and in making it possible for countries to join the global knowledge society and compete in sophisticated knowledge economies not to mention achieving the Vision 2030 and SDG goals.

In this regard, the study investigated the role of Research Information Management Systems (RIMS) as the independent variable vis-à-vis Promoting Science & Technology (PST) as the dependent variable. The unit of analysis was the Kenya Forestry Research Institute. The study used a mixed research design of exploratory, descriptive and quantitative designs with the list of the employees of public research institutes in Kenya formed under the Science, Technology and Innovation Act (repealed) serving as the sampling frame. The questionnaire gathered pertinent information from the respondents and data collected was analyzed using both the descriptive and inferential statistics.

The study identified a strong influence on PST attributable to units of change in RIMS. The study recommended that government and Research Institutes invest in RIMS for increase in PST.

***Key words**: Research Information Management Systems; Promoting Science & Technology; research productivity and innovation.*