EGERTON



UNIVERSITY

BIENNIAL INTERNATIONAL CONFERENCE

PROGRAMME & BOOK OF ABSTRACT

THEME

Research for Innovative Solutions in the 21st Century

MARCH 19-21

SPONSORED BY:





TAGDev (6)









THEME:

RESEARCH FOR INNOVATIVE SOLUTIONS IN THE 21ST CENTURY

Physical and Virtual

19TH - 21st MARCH, 2024

ARC (AGRICULTURE RESOURCE CENTRE) HOTEL,
EGERTON UNIVERSITY,
NJORO, KENYA

Welcoming Message from

The Vice-Chancellor

21st Century Innovative Solutions through Research and Technology Transfer

On behalf of Egerton University, it is with great pleasure that I extend a warm welcome to all esteemed participants of the 15th Biennial International Conference whose theme is "Research for Innovative Solutions in the 21st Century".

In today's rapidly evolving landscape, marked by volatility and uncertainty, the need for resilience and adaptability has never been more pressing. As researchers and scholars, we must rise to the occasion, leveraging our expertise to develop creative solutions that navigate the complexities of the modern era.



Prof. Isaac O. Kibwage Vice Chancellor

The globalization of access to information presents unprecedented opportunities for researchers to enhance the relevance and visibility of their work on a global scale. Through harnessing these resources, we can foster collaboration and exchange of ideas, driving innovation and progress in our respective fields.

This year's conference spans six dynamic sub-themes, encompassing crucial areas such as education, literature, sustainable agriculture, STEM advancements, healthcare, and environmental resilience. As we delve into these topics, we encourage participants to explore avenues for commercializing their research outputs, thereby catalyzing sustainable economic growth and competitiveness.

Keynote addresses will provide invaluable insights into how researchers can harness their expertise to address pressing national challenges, from poverty alleviation to environmental sustainability. By fostering a culture of

knowledge transfer, we can ensure that research findings are effectively utilized to drive positive change across the private and public sectors.

We are honoured to host researchers from near and far, both in person and virtually, as we come together to exchange ideas and advance knowledge. I extend my heartfelt gratitude to all presenters for their contributions, which promise to enrich our collective understanding and inspire innovative solutions for the benefit of Kenya and beyond.

Welcome to the 15th Biennial International Conference at Egerton University.

Prof. Isaac O. Kibwage, Vice Chancellor Egerton University

Message from the

Deputy Vice-Chancellor (Academics, Research and Extension)



Prof. Bernard O. Aduda Deputy Vice Chancellor (Academics, Research and Extension)

Egerton University's Commitment to Research Excellence

It is with immense pleasure that I extend a warm welcome to all participants of the 15th Biennial International Conference, representing the pinnacle of academic inquiry at Egerton University. As Deputy Vice Chancellor (Academics, Research, and Extension), I am honored to witness the culmination of our institution's steadfast dedication to fostering research excellence.

At Egerton University, we hold steadfast to our commitment to prioritize research across all fronts, from budgeting to infrastructure and staffing. Our Strategic Plan serves as a compass, guiding our endeavours towards world-class status by emphasizing the quality of students, teaching and learning facilities, research outputs, ICT resources, and prudent funding allocation and utilization.

This year's conference stands as a testament to our unwavering dedication to advancing knowledge. By opting for a blended conference format, combining virtual and in-person participation, we have ensured that researchers from diverse backgrounds and geographical locations can come together to exchange ideas and forge meaningful collaborations. I urge all participants to fully engage with the programme, seizing the opportunity to interact with presentations and speakers of interest.

With an impressive array of abstracts from esteemed institutions worldwide, including universities and organizations, we anticipate lively and thought-provoking discussions during the conference period, spanning from the 19th to the 21st of March 2024. I extend my deepest appreciation to the Organizing Committee, led by Dr. Miriam Charimbu under the direction of the Director of Research and Extension, Prof. Nancy Mungai, for their meticulous planning and execution, ensuring a seamless and enriching experience for all attendees.

Ladies and gentlemen welcome to the 15th Biennial International Conference at Egerton University.

Prof. Bernard O. Aduda

Deputy Vice Chancellor (Academics, Research and Extension) Egerton University

Message from the

Chair, Conference Organizing Committee



Dr. Miriam K. CharimbuChair, Conference Organizing
Committee

It is my great pleasure to welcome all of you to 15th Egerton University **Biennial** International Conference on behalf of the Egerton University Conference committee. The success of this conference is due to the hard work, efforts and commitment of the members within the committee and the secretariat. A big thank you to all authors and co-authors who responded to the call for abstracts, to all reviewers for providing their technical critique on the abstracts and manuscripts, to all sub theme editors who planned, coordinated, and reviewed all the abstracts and manuscripts that were received and to the secretariat team.

that has facilitated the conference with all the logistics.

The Egerton University 15th Biennial International Conference will be blended with virtual and face-to-face sessions. The conference brings together people from academia, research institutions and other industry experts in various fields to a common forum. The aim of the conference is to provide a platform for participants to share their experiences and research results, deliberate and exchange innovative cutting-edge development ideas, concepts and actions through interactive panel discussions, keynote speakers, paper presentations, question and answer sessions and exhibitions. This year's conference theme "Research for Innovative Solutions in the 21st Century" captures the importance of research, innovation and its outputs in providing solutions to various societal challenges hence building the resilience of the communities.

This conference has attracted 89 research abstracts and papers categorized under 6 subthemes namely Sustainable and Safe Food Systems, Biotechnology and Climate-Smart Agriculture; Education for National Development in a Global Context; One Health Approach, Health System Management, Health Financing, Pandemic Preparedness and Surveillance; Environmental, Technical and Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society; Trends in Science, Technology, Engineering and Mathematics and Literature, Language, Culture, Communication and the Creative Economy.

Over 100 Authors and exhibitors from 8 nationalities will present and exhibit their research products during the three days of conference in two parallel physical and virtual sessions. Check out the programme to ensure you have the opportunity to listen to presentations of your interest. In case you are engaged during the presentations, you will be able to catch up with the presentations of your interest later through recordings which will be posted on the conference website https://conferences.egerton.ac.ke. I encourage you to continue to visiting our webpage for updates and useful information that would make your research journey enjoyable.

I wish you productive discussions, deliberations and networking

Dr. Miriam Charimbu, ChairpersonConference Organizing Committee

CONFERENCE ORGANIZING COMMITTEE

Prof. Benard Aduda. Deputy Vice-Chancellor

Professor of Physics (Academics, Research and Extension)

Ag. Director (Research) Prof. Nancy Mungai,

Professor of Soil Science

Dr. Miriam Charimbu, Chairperson

Lecturer, Department of Crops,

Horticulture and Soil

Dr. Grace Ndeke Education for National Development in a

Global Context

Sustainable and Safe Food Systems, Biotechnology and Climate-Smart

Agriculture for Healthier Diets

Lecturer, Curriculum, Instructions

and Education Management

Dr. Mary Chepchieng Literature, Language, Culture, Communication and the Creative Lecturer, Department of Philosophy, History and Religious Economy

Studies

Dr. Elick Otachi Trends in Science, Technology, Lecturer, Department of **Engineering and Mathematics**

Biological Sciences

Dr. Millicent Mokua Environmental, Technical and Policy Lecturer, Department of Approaches in the Context of Climate **Environment and Natural** Change and Adaptation for a Resilient Resources Society

Trends in Science, Technology, Ms. Nancy Matheri Lecturer, Department of Civil **Engineering and Mathematics**

Engineering

Dr. Dorothy Mituki One Health Approach, Health System **Lecturer,** Department of Human Management, Health Financing, and Nutrition Pandemic Preparedness and Surveillance

Secretariat

Ms. Susan Mbanda-Obura, Information and Communication Technologist

Mr. Peter Gor, System Developer Mr. Ayub Webundi, Administrator

CONFERENCE PROGRAMME CONFERENCE DAY ONE: TUESDAY 19TH MARCH 2024

Programme	Coordinators: Dr. Miria	ım Charimbu
	Prof. Nai	ncy Mungai
8.00am-8.45am	REGISTRATION: Secretariat	-
VENUE	LORD EGERTON HALL	
Chair	Prof. Benard Aduda, Deputy Vice-	Chancellor (ARE)
Rapporteur	Dr. Ann Barmao, Dept. of Curricu	um and Education Mgmt
8.45am	Prayers: Rev. Dr. S. K. Nduati	
	Egerton University Chaplain	
8.55am	National and East African Anthem	
9.00am -9.20am	WELCOMING REMARKS: Prof. Isa	•
0.20 0.50		ancellor
9.20am-9.50am	CHIEF GUEST: Dr. Beatrice Inyang	ent for Higher Education and
	-	of Education, Kenya
9.50am-10.40am	PANEL DISCUSSION	or Education, Kerrya
	Dr. Flora Fedha – Dean, Facult	v of Education & Community
	Studies, Egerton University	, 0. 20000001 & 001111101110,
	Mr. Nehemiah Ngetich, Assista	ant Director,
	National Biosafety Authority (N	*
10.40am-11.00am	Plenary Q and A	
11.00am	GROUP PHOTO	
	COORDINATORS: Dr. E. Otachi a	nnd Mr. M. Kurian
11.10am	HEALTH	BREAK
VENUES	NESSUIT	LORD EGERTON
SUB-THEME	Education for National	Sustainable and Safe
	Development in a Global	Food Systems,
	Context; Literature,	Biotechnology and
	Language, Culture,	Climate-Smart
	Communication and the	Agriculture for Healthier
	Creative Economy	Diets
Chair	Dr. D. Wamukuru	Prof. J. Lelei
Rapporteur	Dr. W. Orora	Dr. M. Oyoo
11.10-11.30am	KEYNOTES S	SPEAKERS
	Prof. Robai Werunga - Assistant	Prof. Joshua Ogendo-
	Professor, Special Education,	Professor, Department of
	University of Massachusetts	Crops, Horticulture and
	Lowell	Soils-Egerton University

	PAPER PRE	SENTERS
11.30am-11.15am	Getuno, D. M. & Mukuni, J. S. Challenges of academic communication in a multilingual higher education setting	Nakiganda R.G, Okello, D. & Bett, H. L. Factors influencing the sustainability of university-incubated agri-businesses: A case of stigma failure, personality and motivation factors
11.15am-11.30am	Githinji, K. P. Harnessing adaptive value- based education within the era of the Fourth Industrial Revolution (4IR) in Kenya	Adoyo, G. O., Charimbu, M. K., Kimurto, P. & Thuranira, M. D. Antifungal effects of Trichoderma spp. and vermiwash against rice blast fungus (Magnaporthe oryzae)
11.30am-11.45am	Kyule, M., Mutonga, S. & Mungai, N. W. Efficacy of agriculture teaching practice projects in secondary schools: The case of Egerton University tracer study	Kuunya, R., Ocwa, A. and Ragan, P. Soil tests as a tool for monitoring soil variability in crop production: Bibliographic analysis
11.45am-12.00nn	Musa, S. R. D., Muhammad, M. T. and Ibrahim, K. U. The relevance of capital market literacy to the academic staff of Federal College of Education Katsina, Katsina State, Nigeria	Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Charimbu, M. K. & Towett, B. K Screening for host plant resistance to fall armyworm (Spodoptera frugiperda) in selected sorghum (Sorghum bicolor) breeding lines using detached leaf assay in Kenya
12.00nn-12.15pm	Gichuru, N. E. The role of higher education in Kenya in promoting national development in a global context: A Case of Egerton, Kenyatta, Nairobi and Strathmore Universities	Ouma, M. A., Ondiek, J. O. & Migwi, P. K. The effects of treatment of prosopis juliflora leaves and pods with bentonite and wood ash on feed intake, milk production and composition in dairy goats

12.15pm-12.30pm	Bala, U. & Umar, S.	Amayu W. T., Kimurto, P. &
12.13piii-12.30piii		
	Percieved impact of	Murerwa, P.
	entreprenuership education as	Effects of selected
	a tool for job creation, poverty	herbicides for management
	reduction and national	of weeds in finger millet
	development in Nigeria	(Eleusine coracana L.) in
		Baringo and Kericho
		counties
12.30pm-12.45pm	Gichuru, N. E. & Kahangwa, L.	Hassan, A., Kimurto, P. K.,
	G.	Mafurah, J. & Nyongesa, G.
	Correlation between	Effect of biofertilizers and
	entrepreneurship education	farmyard manure on soil
	and students' entrepreneurial	properties and nutrient
	intentions: A case of the	uptake of potatoes (Solanum
	University of Dar es Salaam,	tuberosum L.) in the
	Tanzania	highlands of Kenya
12.45-1.00pm	Kyule, M., Mutonga, S. &	Chepkemoi, E., Kimurto, P.,
	Mungai, N. W.	Kopriva, S. & Mafurah, J.
	Project Based Training as a	Analysis of nutrient profiling
	strategy for equipping Z-	and health benefits of finger
	Generation work force with	millet (Eleusine coracana L.)
	transferable agricultural	of selected Finger Millet in
	competencies	Kenya
1.00pm-2.00pm	LUNCH	BREAK
	AFTERNOON BREAK	-OUT SESSIONS
VENUES	NESSUIT	LORD EGERTON
SUBTHEME	Education for National	Sustainable and Safe Food
	Development in a Global	Systems, Biotechnology
	Context; Literature,	and Climate-Smart
	Language, Culture,	Agriculture for Healthier
	Communication and the	Diets
	Creative Economy	
Chair	Dr. M. Kyule	Prof. G. Owuor
Rapporteur	Mr. D. Getuno	Dr. J. Mafurah
2.00pm-2.15pm	Gichuru, N. E.	Lochampa, A., Muasya, T. K.,
	General enterprising	Ilatsia, E. & Ngeno, K.
	tendencies of student teacher	Single Nucleotide
	at school of education,	Polymorphisms in selected
	University of Dar es Salaam,	candidate genes and their
	Tanzania	association with body weight
		in Gallus Gallus Domesticus

2.45 2.20		
2.15pm-2.30pm	Ndegwa. A. G., Ngeno J. K. &	Okeyo, G. O., Charimbu, M.
	Ndeke. G. C. W.	K., Nyaanga, J. G. &
	Effects of simulation teaching	Mendes, T.
	technique on co-educational	Antibacterial potency of
	secondary schools students'	Pelargonium zonale and
	attitude towards learning	Psidium guajava against
	physics in Buuri-East Sub-	bacterial wilt of potato under
	County, Kenya	greenhouse condition
2.30pm-2.45pm	Sululu J., George V. &	Ahmed, A. A. A.,
	Kahimba J.	Mohammed, E. A. H. & Abu-
	Influence of higher education	Goukh, A. A.
	students loans scheme on	Physico-chemical changes
	career choices among	during growth and
	university students in Tanzania	development of tomato
	•	(Solanum lycopersicum L.)
		fruits
2.45pm-3.00pm	Maina, M. E.	Molapo, M. E., Mshenga, P.
	Reviewing the impact of	& Mathenge, M.
	staffing and resources supply	Factors influencing the use of
	in preparedness of teaching	digital technologies in the
	competence-based curriculum	marketing of green leafy
	(CBC) public junior secondary	vegetables among
	schools in Nakuru County,	smallholder farmers in Lari
	Kenya	Sub-County, Kenya
3.00pm-3.15pm	Umar, Y. A.	Obare, I., Charimbu, M. K.,
	Effects of teachers' gender on	Mafurah, J., Woyengo, V. W.,
	students' academic	Okech, R., Abour, A., Mutoni,
	achievement in physics in	C. K., Ferguson, M. E.,
	some selected senior	Tripathi L. & Kariuki, S. M.
	secondary schools of Katsina	Induction of flowering in
	Metropolis, Katsina State,	cassava brown streak
	Nigeria	resistant clones using plant
	Tilgeria	growth regulators, pruning
		and extended photoperiod
		through night-breaks
3.15pm-3.30pm	Juma, A. A.	Ababu, V., Waswa, L. &
3.23piii 3.30piii	Production of 21 st century	Ngoda, P.
	skilled students in Tanzania:	Technological properties of
	A myth or reality?	improved pigeon pea
	/ myth of reality:	varieties in Machakos County
3.30pm-3.45pm	Mbagaya C. V. & Ayiro, L. M.	Bundi, D. N., Nkurumwah, A.
5.50pm 5.45pm	Attachment-based parenting	O. & Munyua, C. N.
	intervention for teenage	Influence of a shared learning
	students in Western Kenya:	platform on participation on
	· ·	
	Does the connect parenting	potato multiplication among

	program work?	small scale farmers in Kamara
		Ward
3.45pm-4.00pm	Maritim, K. E.	Muroki, M. W., Waswa, L.
	The coming of age of open and	M., Fungo, R., Kabwama, A.,
	distance learning in higher	Nduwarugira E.,
	education in Kenya and its	Nepomuscene, N. &
	potential impact on equity	Mahungu, S. M.
		The effect of cooking on
		nutritional characteristics of
		biofortified common beans
		(<i>Phaseolus vulgaris</i>) in
		Burundi
4.00pm-4.15pm	Wamukuru, K. D.	Ntabo, A, Muange, E. N. &
	Influence of education on	Okello, D. O.
	adoption of technology,	Determinants of utilization of
	innovation and good	banana value addition among
	management practices by	small-scale agripreneurs in
	poultry farmers in Nakuru	Kenya: A case of Kisii County
	County	
4.15pm-4.30pm	Chepchieng, C. M., Ngure, K.	Njie, M., Bebe O. B. &
	P., Raburu, A. P., Mburugu, B.	Orenge O. C.
	M., Kung'u, L., Mbutitia, F.,	Knowledge, attitude and
	Kangethe, M., Gitau, S.,	practices of antimicrobials in
	Maina, N. G. & Avisa, H.	dairy herds in Nakuru Peri-
	Knowledge, attitude, beliefs	Urban Area, Kenya
	and practice of COVID-19	
	among school learners in	
	Kenya	
4.30pm-4.45pm	Otieno, M. O., Mareri, A. L. & Khaemba, M. J.	Sonko, L., Bebe B. O. & J. Ondiek
	Implications of Kenyan	Levels of milk yield associated
	newspaper ownership patterns	with different cow drying-off
	on news selection and the	practices deployed by Nakuru
	place of environmental and	peri-Urban smallholder dairy
	climate change stories	farmers
4.45pm-5.00pm	Onyancha, M. R., Chesikaw,	Thiakunu, F., Njehia, B. K.,
	L., Obonyo J. & Wambu, C.	Nguhiu, P. N., M. & Arimi J.
	Effects of political experience	Camel herd structure and
	on participation of young	performance in Isiolo and
	women in political processes in	Marsabit Counties, Kenya
	Nyamira South Sub-County,	
	Kenya	

5.00pm-5.15pm	Nyanjong', O., Ayuya, O. I. &
	Kalio. A M.
	Knowledge roles in
	Agricultural Information
	Networks: Evidence from
	dairy information networks in
	Nakuru County, Kenya
5.15pm-	HEALTH BREAK

CONFERENCE DAY TWO:

WEDNESDAY 20TH MARCH, 2024

8.00am-8.45am	REGISTRATION: Secretariat	
SESSION	N COORDINATOR: DR. N	IANCY MATHERI
Chair	Dr. Elick Otachi	
Rapporteur	Dr. Dorothy Mituki	
8.45am- 8.50am	OPENING PRAYER: Chaplain	n
	Egerton University School	of Performing Arts
8.50am-9.00am	OPENING REMARKS: Prof. N	lancy Mungai
	Director (Research)	
9.25am- 10.00am	KEYNOTE ADDRESS:	
	Prof. James Njiru, CEO/Di	
9.00am-9.40am	,	es Research Institute, Kenya
9.00am-9.40am	PANEL DISCUSSION	
	Irmgard Jordan, Biodivers	
	, , , ,	unty Director Health Admin
9.40am-10.00am	& amp; Planning for Nakuru County	
10.00am-10.10am	Plenary Q and A	PHOTO
10.004111-10.104111	COORDINATORS: Dr. E. Otac	
10.10am-10.40am		
	HEALTH BREAK BREAK-OUT SESSIONS	
VENUES	LORD EGERTON	NESSUIT
SUBTHEME	Trends in Science,	One Health Approach, Health
	Technology, Engineering	System Management, Health
	and Mathematics	Financing, Pandemic
		Preparedness and
		Surveillance
Chair	Dr. S. Omondi	Dr. S. Obure
Rapporteur	Dr. M. Wamalwa	Dr. R. Omenge
10.40am-10.45am	Kithaka, K. E., Maina, M. C.	Odhiambo, C., Chumbe, S.,
	& Ngoo, L.	Makandi, R., Imbusi, G.,
	Investigation of voltage	Sikuku, D., Kipchirchir, D.,
	stability of power	Wakoli, D. M., Chimwani, E.
	distribution network in	& Ondigo, B. N.
	Nairobi Region	Placental metrics and their
		relationship with infants birth
		weight, gestational age and
		maternal Body Mass Index in
1	1	Southern Busia, Western
		Kenya

10.45am-11.00am	RNATIONAL CONFERENCE	Mongo I A lodista A C C
10.45am-11.00am	Mosiori, C. O.	Wanga, L. A., Indieka, A. S. &
	Influence of bulk defect	Matasyoh, J. C.
	density in CIGS on the	Antidermatophytic
	efficiency of Copper Indium	Quinolizidine Alkaloids from
	Gallium Selenide photocell	Calpurnia aurea subsp. aurea
		(Aiton) Benth
11.00am-11.15am	Ekwar, E. P., Muia, W. A. &	Kipchirchi, D., Wakoli, D.M.,
	Nzula, K.	Daniel, S., Odhiambo, C.,
	Water quality assessment of	Chimwani, E., Chumbe, S.,
	tap and kiosks water supply	Makandi, R., Bargul, J. L. &
	systems in Lodwar town in	Ondigo, B. N.
	Turkana County, Kenya	Specificity and sensitivity of
		microscopy and Malaria
		Diagnostic Kit (mRDT First
		Response™) among pregnant
		women presenting for
		delivery in Southern Busia,
		Western Kenya
11.15am-11.30am	Mwalali, J., Oyie, N. &	Abere, M. Z., Nzioki, G. Y.,
	Asiyo M.	Okeyo O. S., Akinyi, B. W.,
	Effects of antenna	Supat T. F., Mohamed. A,
	orientation on line of sight	Wanjiku, T. & Omenge, O. R.
	radio channel for microwave	Predictors of mortality among
	links: A case of Busia County,	patients on maintenance
	Kenya and a case of Oromia	hemodialysis attending
	Region, Ethiopia	Nakuru County Referral and
		Teaching Hospital
11.30am-11.45am	Kibiwot, V. N., Nyaanga,	Wakoli, D.M, Ondigo, B.N,
	D.M., Njue, M. R, &	Ochora, D.O, Amwoma, J.G.,
	Owino, G. O.	Okoth, R., Opot, B.H.,
	Optimization of engine	Cheruiyot A.C, Juma, D. &
	performance and emissions	Akala, H.M.
	fueled by biodiesel blends	Impact of parasite genomic
	,	dynamics on the Sensitivity
		of Plasmodium falciparum
		Isolates to Piperaguine
		and other antimalarial drugs
11.45am-12.00nn	Erick, O. J., Ong'ondo, O. G.	Ahmed E. M. A., Mozzon M.,
	& Otachi, O. E.	Shaikh M. A., Mohammed A.
	Efficiency of a stand-alone	H. E. & Kovács, B.
	recirculating aquaculture	Microelement concentrations
	system in increasing fish	in baobab leaves from Sudan:
	production in a lower-	Implications for human
	middle income country,	nutrition
	Kenya	
1	Nerrya	

12.00nn-12.15pm	Tembo, K. J., Kihia, M. C., Kitaka, K. N., O'Brien, G., Hanzen, C., Mbaru, E., & Kariuki, C. Overlap in habitat exploitation between catadromous anguillids and higher trophic level sympatric fishes in Kenyan east flowing rivers	Chumbe, S. A., Chimwani, E., Onguru, D., Wakoli, D. M., Odhiambo, C., Sikuku, W. D., Imbusi, G., Kipchirchir, D. & Ondigo, B. N. Malaria prevalence and determinants of optimal intermittent preventive malaria therapy and insecticide-treated nets among pregnant women in Southern Busia, Kenya
12.15pm-12.30pm		Mbinya, W. Waterborne disease risk factors and intervention practices: A review
12.30pm-12.45pm		Wambu, C., Oboka, W.A., Waweru, K.M., Anyona, D., Maiyo,S., Nyamongo, I. K., Swardh,K., Bukachi,S., Obonyo, D. & Enns, C Cooperative model in advancing health insurance scheme in Kenya
12.45pm-1.00pm		Maranga, A., Kimani, S. & Mwaura' J. Health facility barriers to effective pain management in advanced breast cancer Kisii, Kenya
1.00pm-2.00pm	LUNCH	BREAK
VENUE	LORD EGERTON	NESSUIT
SUB-THEMES	Sustainable and Safe Food Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets	Sustainable and Safe Food Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets
Chair	Prof B. Bebe	Prof. M. Saidi
Rapporteur 2.00-2.30	Dr. S. Githengu KEYNOTE ADDRESS Dr. Susan Wyche, Associate Department of Media and	Dr. B. Oloo e Professor in the Information Michigan State
	University	

2.30pm-2.45pm	Nyabally, K., Okeno, T. O. &	Agutu, O. F., Mbuku, S. M.,
2.30pm 2.43pm	Muasya, T. K.	Ondiek, O. J. & Bebe, B. O.
		i i
	Genetic parameters for	Economic viability of using
	growth traits of the n'dama	ovsynch and fixed timed
	cattle in the Gambia	artificial insemination
		protocol in breeding
		improvement of pastoral
		herds in the Rangelands
3.00pm-3.15pm	Hagenimana, T.	Obara, J., Mulwa, R., Oyoo,
	Valorizing potato peels	M., Karwitha, M., Runo, S. &
	wastes into a bioactive	Garcia-Ruiz, H.
	compounds peel extract in	Transgenic expression of
	Rwanda	sugarcane mosaic virus VPg in
		maize inbred line CML444
		confers resistance to maize
		lethal necrosis disease
3.30pm-3.45pm	Mutinda, V. M. King'ori, A.	Kasima, S. J., Muyinza, H.,
	M. & Ambula, M. K.	Mugonola, B. &
	Carcass characteristics and	Ndyomugyenyi, K. E.
	sensory quality of broilers	Uganda's production
	fed on extruded sorghum	potential of Black Soldier Fly
	[Sorghum bicolor (L.)	larvae for use in pig diets: A
	Moench] meal and	mini-review
	exogenous phytase-based	
	diets	
3.45pm-4.00pm	Ocwa, A, Illes, A, Bojtor, C,	Katana, J. G., Kilonzo, K. A.,
	Ssemugenze, B &	Wanyoike, G. W., Okumu, M.
	Harsanyi, E	& Owuoche, J.O.
	Biostimulating effects of	Evaluation of yield and yield
	Bacillus simplex on the	components in selected
	photochemical yield and	wheat varieties in Kenya
	grain yield of maize under	in the same same in the same i
	surface drip irrigation	
4.00pm-4.15pm	Ahmed, A. E. M., Mozzon,	Mohammed, E. A., Tóth, R. B.
	M., Shaikh, A. M.,	H., Kardos, G., & Károly, P.
	Mohammed, E. A. H. &	Identification of antibiotic-
	Kovács, B.	resistant bacteria in
	Sustainable and safe food	commercial fish farms in
	systems, biotechnology and	Hungary
	climate-smart agriculture	Transpary
	microelement	
	concentrations in baobab	
	leaves from Sudan:	
	Implications for human	
	nutrition	

4.15pm-4.30pm	Masai, H. J., Ambula, M. K.,	Lelei, J., Owido, F. O. S. &
	King'ori, A. M.	Uwanyirigira, J.
	Performance of honeybees	Climbing Bean Performance
	(Apis mellifera)	under different Irrigation
	supplemented with soybean,	Levels and Mulching types in
	chickpea and ground	Eastern Rwanda
	prosopis juliflora pod meal	
	during dearth period	
4.30pm-4.45pm	Muhindo, D., Lelei, J. J.,	Kangogo, K.C., Muliro, S. P. &
	Munyahali, W., Rewald, B.,	Anyango, O. J.
	Cizungu, L. & Mwonga, S.	Effect of butternut squash
	The effect of biochar and	(Cucurbita moschata) seeds
	water management on	powder on the chemical and
	paddy rice in the Ruzizi	rheological properties of
	plain, Democratic Republic	cultured camel milk and
	of Congo	yoghurt
4.45pm-5.00pm	Obondo, K. O., Lelei, J. J. &	Opondo, E. O. & Ngigi, M.
	Mwonga, S. M.	The role of policy
	Quality assessment of Lake	interventions in shaping the
	Victoria water hyacinth	four dimensions of food
	(Eichhornia crassipes)	security in select developing
	compost systems	countries
5.00pm-	NETWORKING SESSION	
	Co-ordinators: Dr. Grace No	deke
	Dr. Mary Ch	nepchieng

15" BIENNIAL INTERNATIONAL CONFERENCE CONFERENCE DAY THREE:		
٦	THURSDAY 21 ST MAR	CH, 2024
8.00am-8.30am	REGISTRATION: Secretariat	;
SESSION COORDINATORS: DR. MILLICENT MOKUA		
VENUE	LORD EGERTON UNIVERSIT	Υ
Chair	Prof. P. Kimurto	
Rapporteur	Prof. M. Omwamba	
8.30 am – 8.40am	OPENING REMARKS: Dr. M	iriam Charimbu
8.40am-9.10am	KEYNOTE SPEAKER:	
	Dr. Ganga Rao Nadigatla, Prod	
	·	rovement Center (CIMMYT)
9.00am – 9.30am	PANELIST DISCUSSION:	ODI
3.30diii 3.30diii	Dr. Bernard Kirui, Lecture	ar.
	· ·	sources, Egerton University
	The state of the s	mate Policy Director, Africa
9.30am-9.40am		Р РНОТО
	COORDINATORS: Dr. E. Otac	chi and Mr. M. Kurian
9.40am-10.10am	HEALT	H BREAK
VENUE	NESSUIT	LORD EGERTON
SUBTHEME	Sustainable and Safe Food	Environmental, Technical and
SUBTHEME	Systems, Biotechnology and	Policy Approaches in the
SUBTHEME	Systems, Biotechnology and Climate-Smart Agriculture	Policy Approaches in the Context of Climate Change and
SUBTHEME	Systems, Biotechnology and	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient
SUBTHEME	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets	Policy Approaches in the Context of Climate Change and
Chair	Systems, Biotechnology and Climate-Smart Agriculture	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society
	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu,	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K.	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss on advanced	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss on advanced sorghum genotypes under	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in
Chair Rapporteur	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss on advanced sorghum genotypes under field conditions in arid and	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in
Chair Rapporteur 10.10am–10.25am	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss on advanced sorghum genotypes under field conditions in arid and semi-arid areas in Kenya	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in Makueni County, Kenya
Chair Rapporteur 10.10am–10.25am	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss on advanced sorghum genotypes under field conditions in arid and semi-arid areas in Kenya Lagat, N., Oyoo, M. E., Murerwa, P. & Owuoche, J. Identification of grey leaf	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in Makueni County, Kenya Mabururu, M. & Knowen, C. B. Harnessing data driven decisions, the ethical dimension
Chair Rapporteur 10.10am–10.25am	Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets Prof. P. Mshenga Dr P. Migwi Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G., Charimbu, M.K. & Towett, B.K. Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss on advanced sorghum genotypes under field conditions in arid and semi-arid areas in Kenya Lagat, N., Oyoo, M. E., Murerwa, P. & Owuoche, J.	Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society Prof. G. Ogendi Dr. O. Donde Ondiko, J. H., Karanja, A. M., Obulinji, H. W. & Ondimu, K. N. The nature of drought and influence on cereal yields in Makueni County, Kenya Mabururu, M. & Knowen, C. B. Harnessing data driven

	15 BIENNIAL INTERNATIONAL CONFERENC		
	using simple sequence		
	repeat markers (SSR)		
11.00am-11.15am	Gikonyo, C., Oyoo, E. M. & Ronoh, K. T., Kyule, N. M		
	Kimurto, P.	Matheka, M. R.	
	Seed priming to enhance	Socio-historical analysis on the	
	drought tolerance of pigeon	nexus between environmental	
	pea (<i>Cajunus cajan L.</i>) under	conservation and indigenous	
	dryland conditions of Kenya	education among the Mau	
		Ogiek of Kenya	
11.15am-11.30am	Nasimiyu, L., Oyoo, E. M. &	Karanja, A.	
	Wolukau, J.	African indigenous knowledge	
	Morphological diversity	perspectives on climate change	
	assessment of Kenyan	adaptations	
	vanilla (Vanilla spp.)		
	accessions		
11.30am-11.45am	Illa, A., Cheruiyot, E. K. &	Karemeri, M.	
	Matasyoh, J. C.	Uptake of sustainable water	
	Striga (Striga hermonthica	management practices:	
	(Del.) Benth) tolerance of	Evidence from star and non-	
	Maseno EH11 and EH14	rated hotels in Nakuru County,	
	hybrid maize varieties	Kenya	
11.45am-12.00nn	Koech, G. J., Gathungu, E. &	Liaka, V., Gwena, M. O. &	
	Owuor, G.	Milewa, D.	
	Perception of smallholder	Site suitability analysis for an	
	chicken farmers on black	antivenom manufacturing	
	soldier fly larvae (BSFL) as a	laboratory using Geographic	
	super alternative protein	Information Systems	
	source for chicken in Uasin		
	Gishu County, Kenya		
12.00nn-12.15pm	Nyanjong', O., Ayuya, O. I.	Karemeri, M.	
	& Kalio. A. M.	Uptake of green energy	
	Knowledge roles in	practices: evidence from star-	
	Agricultural Information	rated and non-star rated hotels	
	Networks: Evidence from	in Nakuru County, Kenya	
	dairy information networks		
	in Nakuru County, Kenya		

15 DIENNIAE INTERNATIONAE CONTERENCE		
CLOSING SESSION		
VENUE	ARC HOTEL	
SESSION COORDINATORS: Prof. Nancy Mungai		
12.15pm-12.25pm	Egerton University School Performing Arts	
12.25pm-12.45pm	CLOSING REMARKS: Prof. Richard Mulwa,	
	Deputy Vice Chancellor (Administration, Planning and	
	Finance), Egerton University	
12.45pm-1.00pm	VOTE OF THANKS: Dr. Miriam K. Charimbu	
	Chair, Egerton Conference Committee	
CLOSING PRAYER: Rev. Dr. S. K. Nduati		
Egerton University Chaplain		
LUNCH AND DEPARTURES		

TABLE OF CONTENTS

Sustainable and Safe Food Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets

Nakiganda R.G, Okello, D. & Bett, H. L.	
Factors influencing the sustainability of university-incubated agri-	
businesses: A case of stigma failure, personality and motivation factors	1
Adoyo, G. O., Charimbu, M. K., Kimurto, P. & Thuranira, M. D.	
Antifungal effects of Trichoderma spp. and vermiwash against rice	
blast fungus (Magnaporthe oryzae)	2
Kuunya, R., Ocwa, A. and Ragan, P.	
Soil tests as a tool for monitoring soil variability in crop production:	
Bibliographic analysis	3
Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Charimbu, M. K. &	
Towett, B. K	
Screening for host plant resistance to fall armyworm (Spodoptera	
frugiperda) in selected sorghum (Sorghum bicolor) breeding lines using	
detached leaf assay in Kenya	4
Ouma, M. A., Ondiek, J. O. & Migwi, P. K.	
The effects of treatment of prosopis juliflora leaves and pods with	
bentonite and wood ash on feed intake, milk production and	
composition in dairy goats	5
Amayu W. T., Kimurto, P. & Murerwa, P.	
Effects of selected herbicides for management of weeds in finger millet	
(Eleusine coracana L.) in Baringo and Kericho counties	7
Hassan, A., Kimurto, P. K., Mafurah, J. & Nyongesa, G.	
Effect of biofertilizers and farmyard manure on soil properties and	
nutrient uptake of potatoes (Solanum tuberosum L.) in the highlands of	
Kenya	9
Chepkemoi, E., Kimurto, P., Kopriva, S. & Mafurah, J.	
Analysis of nutrient profiling and health benefits of finger millet	
(Eleusine coracana L.) of selected Finger Millet in Kenya	11
Lochampa, A., Muasya, T. K., Ilatsia, E. & Ngeno, K.	
Single Nucleotide Polymorphisms in selected candidate genes and their	
association with body weight in Gallus Gallus Domesticus ecotypes	12
Okeyo, G. O., Charimbu, M. K., Nyaanga, J. G. & Mendes, T.	
Antibacterial potency of Pelargonium zonale and Psidium guajava against	
bacterial wilt of potato under greenhouse condition	13
Ahmed, A. A. A., Mohammed, E. A. H. & Abu-Goukh, A. A.	
Physico-chemical changes during growth and development of tomato	
(Solanum lyconersicum L.) fruits	15

15 TH BIENNIAL INTERNATIONAL CONFERENCE	
Molapo, M. E., Mshenga, P. & Mathenge, M. Factors influencing the use of digital technologies in the marketing of	
green leafy vegetables among smallholder farmers in Lari Sub-County, Kenya	16
Obare, I., Charimbu, M. K., Mafurah, J., Woyengo, V. W., Okech, R., Abour, A.,	10
Mutoni, C. K., Ferguson, M. E., Tripathi L. & Kariuki, S. M.	
Induction of flowering in cassava brown streak resistant clones using plant growth regulators, pruning and extended photoperiod through	17
night-breaks	17
Technological properties of improved pigeon pea varieties in Machakos	
County	18
Bundi, D. N., Nkurumwah, A. O. & Munyua, C. N.	
Influence of a shared learning platform on participation on potato	
multiplication among small scale farmers in Kamara Ward	19
Muroki, M. W., Waswa, L. M., Fungo, R., Kabwama, A., Nduwarugira E.,	
Nepomuscene, N. & Mahungu, S. M.	
The effect of cooking on nutritional characteristics of biofortified	
common beans (<i>Phaseolus vulgaris</i>) in Burundi	21
Ntabo, A, Muange, E. N. & Okello, D. O.	
Determinants of utilization of banana value addition among small-	
scale agripreneurs in Kenya: A case of Kisii County	23
Njie, M., Bebe O. B. & Orenge O. C.	
Knowledge, attitude and practices of antimicrobials in dairy herds in Nakuru Peri-Urban Area, Kenya	24
Sonko, L., Bebe B. O. & J. Ondiek	
Levels of milk yield associated with different cow drying-off practices deployed by Nakuru peri-Urban smallholder dairy farmers	25
Thiakunu, F., Njehia, B. K., Nguhiu, P. N., M. & Arimi J.	
Camel herd structure and performance in Isiolo and Marsabit Counties, Kenya	26
Nyabally, K., Okeno, T. O. & Muasya, T. K.	
Genetic parameters for growth traits of the n'dama cattle in the Gambia.	27
Hagenimana, T.	
Valorizing potato peels wastes into a bioactive compounds peel extract in Rwanda	29
Mutinda, V. M. King'ori, A. M. & Ambula, M. K.	
Carcass characteristics and sensory quality of broilers fed on extruded	
sorghum [Sorghum bicolor (L.) Moench] meal and exogenous phytase- based diets	30
Ocwa, A, Illes, A, Bojtor, C, Ssemugenze, B & Harsanyi, E	

Biostimulating effects of Bacillus simplex on the photochemical yield and grain yield of maize under surface drip irrigation

31

Ahmed, A. E. M., Mozzon, M., Shaikh, A. M., Mohammed, E. A. H. & Kovács, B.	
Sustainable and safe food systems, biotechnology and climate-smart	
agriculture microelement concentrations in baobab leaves from Sudan:	
Implications for human nutrition	32
Masai, H. J., Ambula, M. K., King'ori, A. M.	
Performance of honeybees (Apis mellifera) supplemented with soybean,	
chickpea and ground prosopis juliflora pod meal during dearth period	33
Muhindo, D., Lelei, J. J., Munyahali, W., Rewald, B., Cizungu, L. & Mwonga, S.	
The effect of biochar and water mgmt on paddy rice in the Ruzizi plain,	
Democratic Republic of Congo	34
Obondo, K. O., Lelei, J. J. & Mwonga, S. M.	
Quality assessment of Lake Victoria water hyacinth (Eichhornia crassipes)	
compost systems	36
Agutu, O. F., Mbuku, S. M., Ondiek, O. J. & Bebe, B. O.	
Economic viability of using ovsynch and fixed timed artificial insemination	
protocol in breeding improvement of pastoral herds in the Rangelands	38
Obara, J., Mulwa, R., Oyoo, M., Karwitha, M., Runo, S. & Garcia-Ruiz, H.	
Transgenic expression of sugarcane mosaic virus VPg in maize inbred	
line CML444 confers resistance to maize lethal necrosis disease	39
Kasima, S. J., Muyinza, H., Mugonola, B. & Ndyomugyenyi, K. E.	
Uganda's production potential of Black Soldier Fly larvae for use in pig	
diets: A mini-review	40
Katana, J. G., Kilonzo, K. A., Wanyoike, G. W., Okumu, M. & Owuoche, J.O.	
Evaluation of yield and yield components in selected wheat varieties in	
Kenya	41
Mohammed, E. A., Tóth, R. B. H., Kardos, G., & Károly, P.	
Identification of antibiotic-resistant bacteria in commercial fish farms in	
Hungary	42
Lelei, J., Owido, F. O. S. & Uwanyirigira, J.	
Climbing Bean Performance under different Irrigation Levels and	
Mulching types in Eastern Rwanda	43
Kangogo K.C., Muliro, S. P. & Anyango, O. J.	
Effect of butternut squash (Cucurbita moschata) seeds powder on the	
chemical and rheological properties of cultured camel milk and yoghurt	44
Opondo, E. O. & Ngigi, M.	
The role of policy interventions in shaping the four dimensions of food	
security in select developing countries	45
Njogu, N. W., Kamau, A., Kimurto, P. K., Manyasa, E., Nyaanga, J. G.,	
Charimbu, M.K. & Towett, B.K.	
Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss	
on advanced sorghum genotypes under field conditions in arid and semi-	
arid areas in Kenya	46
Lagat, N., Oyoo, M. E., Murerwa, P. & Owuoche, J.	
Identification of grey leaf spot resistance in F ₂ maize (Zea mays L.)	
populations using simple sequence repeat markers (SSR)	48

15 BIENNIAL INTERNATIONAL CONFERENCE	
Gikonyo, C., Oyoo, E. M and Kimurto, P.	
Seed priming to enhance drought tolerance of pigeon pea (Cajunus	
cajan L.) under dryland conditions of Kenya	49
Nasimiyu, L., Oyoo, E. M. and Wolukau, J.	
Morphological diversity assessment of Kenyan vanilla (Vanilla spp.)	
accessions	50
Illa, A., Cheruiyot, E. K. & Matasyoh, J. C.	
Striga (Striga hermonthica (Del.) Benth) tolerance of Maseno EH11	
and EH14 hybrid maize varieties	51
Koech, G. J., Gathungu, E. & Owuor, G.	
Perception of smallholder chicken farmers on black soldier fly larvae	
(BSFL) as a super alternative protein source for chicken in Uasin	
Gishu County, Kenya	52
Nyanjong', O., Ayuya, O. I. and Kalio. A M.	
Knowledge roles in Agricultural Information Networks: Evidence from	
dairy information networks in Nakuru County, Kenya	53
Education for National Development in a Global Context;	
Education for National Development in a Global Context,	
Getuno, D. M. & Mukuni, J. S.	
Challenges of academic communication in a multilingual higher	
education setting	54
Githinji, K. P.	
Harnessing adaptive value-based education within the era of the Fourth	
Industrial Revolution (4IR) in Kenya	55
Kyule, M., Mutonga, S. & Mungai, N. W.	
Efficacy of agriculture teaching practice projects in secondary schools:	
The case of Egerton University tracer study	56
Musa, S. R. D., Muhammad, M. T. and Ibrahim, K. U.	
The relevance of capital market literacy to the academic staff of Federal	
College of Education Katsina, Katsina State, Nigeria	57
Gichuru, N. E.	
The role of higher education in Kenya in promoting national development	
in a global context: A Case of Egerton, Kenyatta, Nairobi and Strathmore	
Universities	58
Bala, U. & Umar, S.	
Percieved impact of entreprenuership education as a tool for job	
creation, poverty reduction and national development in Nigeria	59
Gichuru, N. E. & Kahangwa, L. G.	
Correlation between entrepreneurship education and students'	
entrepreneurial intentions: A case of the University of Dar es	
Salaam, Tanzania	60

Kyule, M., Mutonga, S. & Mungai, N. W.	
Project Based Training as a strategy for equipping Z-Generation work	
force with transferable agricultural competencies	61
Gichuru, N. E.	
General enterprising tendencies of student teacher at school of	
education, University of Dar es Salaam, Tanzania	62
Ndegwa. A. G., Ngeno J. K. & Ndeke. G. C. W.	
Effects of simulation teaching technique on co-educational secondary	
schools students' attitude towards learning physics in Buuri-East Sub-	
County, Kenya	63
Sululu J., George V. & Kahimba J.	
Influence of higher education students loans scheme on career choices	
among university students in Tanzania	64
Maina, M. E.	
Reviewing the impact of staffing and resources supply in preparedness	
of teaching competence-based curriculum (CBC) public junior	
secondary schools in Nakuru County, Kenya	65
Umar, Y. A.	
Effects of teachers' gender on students' academic achievement in	
physics in some selected senior secondary schools of Katsina	
Metropolis, Katsina State, Nigeria	66
Juma, A. A.	
Production of 21st century skilled students in Tanzania: A myth or	
reality?	67
Mbagaya C. V. & Ayiro, L. M.	
Attachment-based parenting intervention for teenage students in	
Western Kenya: Does the connect parenting program work?	68
Maritim, K. E.	
The coming of age of open and distance learning in higher education in	
Kenya and its potential impact on equity	69
Wamukuru, K. D.	
Influence of education on adoption of technology, innovation and good	
management practices by poultry farmers in Nakuru County	70
Chepchieng, C. M., Ngure, K. P., Raburu, A. P., Mburugu, B. M., Kung'u, L.,	
Mbutitia, F., Kangethe, M., Gitau, S., Maina, N. G. & Avisa, H.	
Knowledge, attitude, beliefs and practice of COVID-19 among school	
learners in Kenya	71

Literature, Language, Culture, Communication and the Creative Economy

Otieno, M. O., Mareri, A. L. & Khaemba, M. J. Implications of Kenyan newspaper ownership patterns on news selection and the place of environmental and climate change stories Onyancha, M. R., Chesikaw, L., Obonyo J. & Wambu, C. Effects of political experience on participation of young women in political processes in Nyamira South Sub-County, Kenya	72 73
Trends in Science, Technology, Engineering and Mathema	tics
Kithaka, K. E., Maina, M. C. & Ngoo, L.	
Investigation of voltage stability of power distribution network in Nairobi Region	74
Mosiori, C. O.	
Influence of bulk defect density in CIGS on the efficiency of Copper Indium Gallium Selenide photocell	75
Ekwar, E. P., Muia, W. A. & Nzula, K.	, ,
Water quality assessment of tap and kiosks water supply systems in Lodwar town in Turkana County, Kenya	76
Mwalali, J., Oyie, N. & Asiyo M.	
Effects of antenna orientation on line of sight radio channel for microwave links: A case of Busia County, Kenya and a case of Oromia Region, Ethiopia	77
Kibiwot, V. N., Nyaanga, D.M., Njue M. R, & Owino G. O.	,,
Optimization of engine performance and emissions fueled by biodiesel blends	78
Erick, O. J., Ong'ondo, O. G. & Otachi, O. E.	
Efficiency of a stand-alone recirculating aquaculture system in	
increasing fish production in a lower-middle income country, Kenya Tembo, K. J., Kihia M. C., Kitaka K. N., O'Brien G., Hanzen, C., Mbaru E., &	79
Kariuki C.	
Socio-historical analysis on the nexus between environmental conservation and indigenous education among the Mau Ogiek of Kenya .	80

One Health Approach, Health System Management, Health Financing, Pandemic Preparedness and Surveillance

Odhiambo, C., Chumbe, S., Makandi, R., Imbusi, G., Sikuku, D., Kipchirchir,	
D., Wakoli, D. M., Chimwani, E. & Ondigo, B. N.	
Placental metrics and their relationship with infants birth weight,	
gestational age and maternal Body Mass Index in Southern Busia,	
Western Kenya	82
Wanga, L. A., Indieka, A. S. & Matasyoh, J. C.	
Antidermatophytic Quinolizidine Alkaloids from Calpurnia aurea	
subsp. aurea (Aiton) Benth	84
Kipchirchi D., Wakoli D.M., Daniel S., Odhiambo, C., Chimwani E., Chumbe,	
S., Makandi R., Bargul J. L. & Ondigo B. N.	
Specificity and sensitivity of microscopy and Malaria Diagnostic	
Kit (mRDT First Response™) among pregnant women presenting	
for delivery in Southern Busia, Western Kenya	85
Abere, M. Z., Nzioki, G. Y., Okeyo O. S., Akinyi, B. W., Supat T. F., Mohamed. A,	
Wanjiku, W. T. & Omenge, O. R.	
Predictors of mortality among patients on maintenance hemodialysis	
attending Nakuru County Referral and Teaching Hospital	86
Wakoli, D.M, Ondigo, B.N, Ochora D.O, Amwoma, J.G., Okoth, R., Opot, B.H.,	
Cheruiyot A.C, Juma, D. & Akala, H.M.	
Impact of parasite genomic dynamics on the Sensitivity of Plasmodium	
falciparum Isolates to Piperaquine and other antimalarial drugs	88
Ahmed E. M. A., Mozzon M., Shaikh M. A., Mohammed A. H. E. & Kovács, B.	
Microelement concentrations in baobab leaves from Sudan:	
Implications for human nutrition	90
Chumbe, S. A., Chimwani, E., Onguru, D., Wakoli, D. M., Odhiambo, C.,	
Sikuku, W. D., Imbusi, G., Kipchirchir, D. & Ondigo, B. N.	
Malaria prevalence and determinants of optimal intermittent preventive	
malaria therapy and insecticide-treated nets among pregnant women in	
Southern Busia, Kenya	91
Mbinya, W.	
Waterborne disease risk factors and intervention practices:	
A review	93
Imbusi, G., Wakoli, M. D, Sikuku, D., Kipchirchir, D., Odhiambo, C.,	
Chimwani, E., Chumbe, S. & Makandi R.	
Overlap in habitat exploitation between catadromous anguillids	
and higher trophic level sympatric fishes in Kenyan east flowing rivers	94
Wambu C., Oboka, W.A., Waweru, K.M., Anyona, D., Maiyo, S., Nyamongo, K.,	
Swardh, K., Bukachi, S., Obonyo, D. and Enns, C.	
Cooperative model in advancing health insurance scheme in Kenya Health	
facility harriers to effective nain management in advanced breast cancer	

15 BIENNIAL INTERNATIONAL CON	FERENCE	
Kisii, Kenya		9 5
Maranga, A., Kimani, S. and Mwaura	ı, J.	
Health facility barriers to effect	ive pain management in advanced	
breast cancer Kisii, Kenya		96
Environmental Technical a	nd Policy Approaches in the Co.	a+av+
· · · · · · · · · · · · · · · · · · ·	nd Policy Approaches in the Cor	
of Climate Change and <i>I</i>	Adaptation for a Resilient Societ	ty
Ondiko, J. H., Karanja, A. M., Obulinj	i, H. W. & Ondimu, K. N.	
The nature of drought and influ	ience on cereal yields in Makueni	
County, Kenya		98
Mabururu, M. & Knowen, C. B.		
	ns, the ethical dimension of climate	
	on	99
Ronoh, K. T., Kyule, N. M. & Matheka		
Socio-historical analysis on the		
_	ducation among the Mau Ogiek of	
- /-		100
Karanja, A.		
σ.	perspectives on climate change	
' '		101
Karemeri, M.		
	es: evidence from star-rated and	400
	ı County, Kenya	103
Liaka V., Gwena, M. O. & Milewa, D.		
	ntivenom manufacturing laboratory using	104
• .	ns	104
Karemeri, M.	anagement practices: Evidence from	
	kuru County, Kenya	105
star and non-rated noters in Na	Kuru County, Kenya	103

SUB-THEME 1

Food Systems,
Biotechnology and
Climate-Smart
Agriculture for Healthy
Diets

Factors influencing the sustainability of university-incubated agri-businesses: A case of stigma failure, personality and motivation factors

Nakiganda R.G, Dickson Okello and Bett, H. L.

Agricultural Economics and Agribusiness Department,
Egerton University, Kenya
Corresponding Author: rachealgladysn@gmail.com

ABSTRACT

Universities, government bodies, and non-governmental organizations have invested in incubating agribusinesses within universities to enhance youth employment opportunities since universities are major institutions channeling youths to job markets. However, many of these incubated agribusinesses (IB) struggle to survive beyond three years. This study sought to understand the factors that motivate university students to join university incubation programs (UIP) and the impact of these motivation factors on the economic, environmental and social sustainability of their agribusinesses. Principal Component Analysis (PCA) was used to create dimensions in the motivation factors, revealing the 2 Principal Components. Findings reveal that the majority of university students take the initiative to participate in UIP because they have a need rather than seeing an opportunity. The two components, together with stigma failure and personality, were analysed in the Structural Equation Model under Partial least square methods. Findings reveal a positive and significant relationship between necessity motivation factors and the sustainability of IB (p= 0.000), as well as a positive and significant relationship between personality/behavioural factors and the sustainability of IB (p=0.000). However, it was found that opportunity motivation factors had no significant relationship to the sustainability of (IB) (p= 0.831). This study suggests that university policymakers should institutionalise UIP. University business incubators (UBI) should understand the need for their incubates before the incubation process. As they develop the incubation models, holistic attention is needed for all business sustainability factors, including the personality of the students to be enrolled.

Keywords: Agribusiness, business incubation, PCA, PLS-SEM, sustainability

Antifungal effects of Trichoderma spp. and vermiwash against rice blast fungus (Magnaporthe oryzae)

¹Adoyo, G. O., *¹Charimbu, M. K., ¹Kimurto, P. and ²Thuranira, M. D. ¹Department of Crops, Horticulture and Soil Sciences, Egerton University, Njoro, Kenya; ²Department of Crop Health, KALRO-Horticulture Research Institute, Kenya

Corresponding Author: miriam.charimbu@egerton.ac.ke

ABSTRACT

Rice blast caused by Magnaporthe oryzae is a devastating fungal disease of rice globally affecting all plant parts and seeds. Use of fungicides is the major management method of the disease; however, fungicides have negative impacts on environment and human health. The objective of this study was to determine the potential efficacy of Trichoderma isolates, BG-1, SYA-E, BRO-2, SYA-C, EM-B and vermiwash against rice blast fungus (M. oryzae). The assay was carried out in the laboratory in a Completely Randomized Design (CRD) with three replications. M. oryzae fungus was isolated from naturally infected rice tissues of variety ITA-310 in west Kano irrigation scheme by sporulation of the pathogen on a moist chamber and then streaked on 2% water agar media and cultured for five days. Both Trichoderma and M. oryzae isolates were cultured in PDA (Potato Dextrose Agar) for 7 days and inhibition tested using dual culture method. A disc plug of 8 mm radius of M. oryzae and 5 Trichoderma isolates were picked from the periphery of the mycelium and placed 7cm apart in 9cm PDA plates under aseptic conditions. Rice straw vermiwash harvested after 14 days from the vermicomposting structure and diluted to 10% was streaked at the edge of the agar plate with a test pathogen aseptically. The inoculated petri dishes were incubated at 25±2 °C and data on radial growth in mm of the 5 Trichoderma spp and vermiwash against M. oryzae colonies was collected after 48hrs, then after every 24hrs for 7 days. The 6 bio controls were significantly different for antifungal activity at p≤0.0001. However, the control was significantly different to all the biocontrol's at p≤0.05. The biocontrol that exhibited the highest antifungal activity against M. oryzae were Vermiwash, EM-B, SYA-C, and BRO-2 with inhibition of 72.81%, 71.49% and 71.05%, respectively exhibiting potential to be used as controls for rice blast disease. Additional research of the selected best performing Trichoderma isolates and vermiwash need to be evaluated under green house and field experiments to suppress rice blast disease for enhanced rice productivity.

Keywords: Biocontrol, Invitro, Isolates, rice blast, vermiwash

Soil tests as a tool for monitoring soil variability in crop production: Bibliographic analysis

*Kuunya, R., Ocwa, A. and Ragan, P.

¹Institute of Land Use, Engineering and Precision Farming Technology, Faculty of Agricultural and Food Sciences and Environmental Management, University of Debrecen, 138 Böszörményi street, 4032, Debrecen, Hungary.

*Corresponding Author: kuu79ron@mailbox.unideb.hu

ABSTRACT

Soil properties significantly impacts crop productivity. Soil properties vary by geographical location, climate, management practices, among other factors. Therefore, understanding latest the focus of research on soil variability monitoring becomes paramount. The objective of this review was to identify the latest research focus on soil tests as a tool for monitoring soil variability globally. Literature was searched in Scopus database covering 2020-2023. Data was exported and analyzed using Vosviewer software. In total, 815 documents were retrieved comprising of research, review and conference articles, and books. Results showed increased investigations in soil variability monitoring. Countries such as China, USA, Canada, India, Australia, and France were leading in soil variability monitoring using soil tests. In Africa, Ethiopia, Kenya, South Africa, Morocco, Nigeria, Egypt and Tanzania led in soil testing and monitoring. Broadly, funding of soil monitoring research was from America and Asia. The main soil changes monitored were; soil nitrogen, phosphorus, potassium, organic carbon, moisture and microorganisms. Agricultural robots were utilized to perform certain soil testing processes. Remote sensing and machine learning were utilized to predict future soil property changes. The major limitation in the use of these technologies was the costs involved. Generally, continuous soil nutrient monitoring is necessary to increase nutrient use efficiency and agronomic efficiency, reduce environmental pollution and ensure sustainable use of soil resources for crop production. Therefore, it is recommended that countries develop mobile precision equipment that are cost effective and user friendly for sustainable soil monitoring.

Keywords: Monitoring, remote sensing, soil tests, soil variability

Screening for host plant resistance to fall armyworm (Spodoptera frugiperda) in selected sorghum (Sorghum bicolor) breeding lines using detached leaf assay in Kenya

¹Njogu, N. W., ¹Kamau, A., ¹Kimurto, P. K., ²Manyasa, E., ¹Charimbu, M. K. and ^{1*}Towett, B. K

¹Department of crops, horticulture and Soils, Egerton University, P.O. Box 536, Egerton Kenya; ²International maize and Wheat Improvement Center (CIMMYT), Nairobi.

Corresponding Author: kimurtopk@egerton.ac.ke

ABSTRACT

Fall army worm (FAW) has continued to cause significant damage in cereals such as maize and Sorghum in Kenya and other African countries. Use of FAW resistant sorghum genotypes would provide sustainable alternative strategies. To identify resistant genotypes, 16 advanced sorghum genotypes were evaluated for resistance using detached leaf bio-assay in the laboratory at Egerton University in March, 2020. Mass rearing of test insects was carried out in the insect rearing laboratory at Egerton University while sorghum test plants were raised in the green house in Kenya Agriculture and Livestock Research Organization (KALRO) Njoro. Experiment was laid out in completely randomized design and replicated three times. Data collected included larval survival rate (%), larval weight (mg), Pupation rate (%), pupal weight and adult emergence (%). Data was subjected to analysisis of variance using Statistical software (SAS) version 9.2. Statistical differences among the treatment means for all the variables were compared using LSD test at p \leq 0.05. Tested genotypes significantly influenced the larval weight, Pupation, pupal weight and adult emergence, after feeding the neonate larvae for eight days. Genotype did not however influence larval survival (p = 0.28). larval survival ranged between 63.3 and 100%, and weighed between 15 and 35.75 (mg). Rate of Pupation ranged between 25 and 90% while pupae weighed between 0.04 and 0.17(mg). Adult emergence rate ranged between 27.00 and 89.70%. Genotypes, GBK 000446, IS 21055, GBK 000121, GBK 000392, IESV 92022/1 SH, IESV 92042 SH consistently had low larval survival and weight, Pupation rate, pupal weight and adult emergence rate and could be resistant to fall armyworm. The larval weight positively and significantly correlated with pupation rate (r=0.66*), adult emergence rate (r=0.47*), larval survival rate (r=0.05*). Adult emergence rate also significantly correlated with Pupation rate (r=0.69*), larval survival (r=0.19*). Pupation rate positively correlated with larval survival rate (r=0.29*). Results from this study shows that larval weight and pupation, pupal weight, pupal emergence and larval survival are important traits that can be used to screen sorghum genotypes for susceptibility and resistance. More evaluations on morpho physio chemical

properties could validate the host plant resistance in selected sorghum genotypes.

Keywords: Fall armyworm (*Spodoptera frugiperda*), host plant, sorghum (*Sorghum bicolor*),

The effects of treatment of *prosopis juliflora* leaves and pods with bentonite and wood ash on feed intake, milk production and composition in dairy goats

Ouma, M. A., Ondiek, J. O. and Migwi, P. K.

¹Egerton University, Faculty of Agriculture, Department of Animal Science; P.O. Box 536- 20115, Egerton, Kenya

Corresponding Author: oumamary08@gmail.com; +254712148324

ABSTRACT

The undesirable content of tannins in *Prosopis juliflora* leaves and pods (LP) affect efficient usage of this leguminous tree forage by goats. These tannins not only bind proteins making them unavailable to the animal but also make this plant, more so the leaves, bitter and unpleasant to animals. P. juliflora is drought resistant and nutritious constituting 21% and 14% crude protein in leaves and pods respectively. A feeding trial was conducted to determine the effect of wood ash and bentonite as binders when used on P. juliflora and fed to lactating dairy goats. A digestibility trial was first conducted to determine the ratio of *P. juliflora* LP that was more digestible to the goats. Feed leftovers were collected and weighed each morning to determine intake, and goats were also milked in the morning and evening and milk produced measured to determine milk production. Milk samples from every treatment were also analyzed using the Ultra scan milk analyzer to determine the effect on milk composition. The results showed that treated diets had higher intake compared to the untreated. The same applied for milk production, composition and mineral content. In all the experiments that were carried out, wood ash proved to be a better binder when used at 400 g/l of water. However, the performance of wood ash and bentonite was not significantly different in most occasions.

Keywords: Bentonite, *in-vitro* digestibility, milk composition, natural binders, tannins, wood ash

Effects of selected herbicides for management of weeds in finger millet (*Eleusine coracana* L.) in Baringo and Kericho counties

Amayu W. T., Kimurto, P. and Murerwa, P.

Department of Crops, Horticulture and Soils, Egerton University, P.O. Box 536, Egerton Kenya

Corresponding Author: tirihana15@gmail.com

ABSTRACT

Finger millet (Eleusine coracana L.) is a cereal that is drought resilient and can provide food and nutrition security to most communities in Kenya. Its production is however limited by many factors and one of them is weed infestation. Efforts to manage weeds have seen farmers rely on manual weeding which has led to high drudgery among women and loss of moisture due to frequent soil disturbance. Use of herbicides provides an alternative to mechanical weeding hence realization of conservation agriculture. The objectives of this study were (i) to determine the effects of selected herbicides on weed control and yield of finger millet (ii) to determine the effects of different application rates of the herbicides at different growth stages on weed control and yield of finger millet. Field experiments were conducted in Baringo and Kericho Counties (Agricultural Training Centres) in 2020 and 2021 to determine the effects of selected herbicides on weed management. Herbicides evaluated included two post-emergent herbicides (Ariane and 2-4D) and four pre-emergent herbicides (Sencor, Primagram, Maguguma and Dual gold). The effectiveness of different rates of the best selected herbicides from locational trial was conducted at Njoro. Data was collected on %WCE, crop biomass, yields and crop phytotoxicity rating that was scored using a scale. The treatments means for the experiment was separated using Tukey's honest significant difference at $p \le 0.05$. The results of the study showed that post -emergent herbicides, Ariane and 2-4D recorded higher weed control efficiency of 90.56% and 88.88% respectively and no phytotoxicity. Pre-emergent herbicides Sencor, Maguguma and Primagram recorded high weed control efficiency of 89.92%, 90.13% and 88.34% respectively however, they were associated with high crop phytotoxicity ratings, lower yields and crop biomass. 2-4D and Ariane recorded a higher crop biomass of 2.6 t/ha and 2.7 t/ha that as compared to negative control (no spray) that had a crop biomass of 0.5 t/ha. Application of 2-4D or Ariane resulted to higher yields of 5.04 t/ha and 5.4 t/ha respectively as compared to no yield when Lumax was used, Due to death of the crop due to phytotoxicity.

Results from application of different rates of herbicides at different growth stage showed that application of either 2-4D or Ariane at 1.5 times the registered rate of application during the seedling stage of the crop recorded a yield of 2.88 t/ha and 2.90 t/ha respectively with no crop phytotoxicity recorded. Findings of this study have demonstrated that use of either Ariane or 2-4D at 1.5times the registered rate of application should be encouraged to farmers for the management of weeds in finger millet.

Keywords: Finger millet; herbicides; weed management, crop yield

Effect of biofertilizers and farmyard manure on soil properties and nutrient uptake of potatoes (*Solanum tuberosum* L.) in the highlands of Kenya

¹Hassan, A., ¹Kimurto, P. K., ¹Mafurah, J. and ²Nyongesa, G. ¹Department of crops, horticulture and Soils, Egerton University, P.O. Box 536, Egerton Kenya; ²KALRO - Tigoni. Corresponding Author: kimurtopk@egerton.ac.ke

ABSTRACT

Low soil fertility is the one of the constraints to potato production in Kenya. There are limited studies on integrated use of bio- and organic fertilizers in potato production. This study was conducted to evaluate the effect of farmyard manure with biofertilizers (Trichoderma asperellum-TR and Bacillus subtilis-BA) on soil physicochemical properties, nutrient uptake and yield of potatoes. Two field experiments were carried out in at Egerton University and KALRO Tigoni using two potato varieties (Shangi and Kenya mpya) during the 2019-2020. Randomized complete block design in split-plot arrangement was used; varieties were the main plot while the farmyard manures were subplots, replicated three times. The treatments were; 30 t ha⁻¹ of farmvard manure (FYM), two different biofertilizers (Trichoderma asperellum-TA and Bacillus subtilis-BA) applied at the rate of (150 mL 10⁻¹ kg) and NPK (0 and 100 kg ha⁻¹) as negative and positive controls, respectively. Data were subjected to the SAS software version 9.2. Analysis of variance (ANOVA), using procedures of SAS (9.3) at P≤0.05. The result showed that there was significant were significant differences (P<0.05) in fertilizer treatments and varieties on soil soil physicochemical properties, nutrient update and yield in both sites. Tuber yield and tuber dry matter were significantly (P<0.05) affected by fertilizer treatments with FYM having highest increase tuber yield and dry matter by 25.15% and 13.16 %, followed by : FYM + Trichoderma asperellum which increased by 20.28% and 8.14% respectively. There was significant (P<0.05) fertilizer treatment on uptake of both macronutrients and micronutrients, with FYM (30 t ha⁻¹) with biofertilizers as compared to the control. FYM+TR showed highest increase in nutrient uptake of N: 74.77 kg ha⁻¹, P: 35.16 kg ha⁻¹ ¹, and K: 43.88 kg ha⁻¹, Ca: 49.53 kg ha⁻¹, Mg: 26.29 kg ha⁻¹, Fe: 0.48 kg ha⁻¹, Mn 0.22 kg ha⁻¹, Cu 0.07 kg ha⁻¹, Zn 0.14 kg ha⁻¹ compared to the negative control. Also, the combination of inorganic fertilizers (NPK) and biofertilizers significantly increased (P<0.05) nutrient uptake compared to when NPK and biofertilizer are applied singly. Varietal differences were observed on tuber yields but, not on dry matter; Kenya mpya had higher tuber yield than Shangi

between 20-38%. The study recommends using integrated FYM and Biofertilizers for potato production in since they are beneficial to potato farmers.

Keywords: *Bacillus subtilis*, Bio-fertilizers, FYM, Potato varities, Nutrients uptake, *Trichoderma asperellum*

Analysis of nutrient profiling and health benefits of finger millet (Eleusine coracana L.) of selected Finger Millet in Kenya

¹Chepkemoi, E., ¹Kimurto, P., ²Kopriva, S. and ¹Mafurah, J.

¹Department of Crops, Horticulture and Soils, Faculty of Agriculture, Egerton University, P. O. Box 536-20115, Egerton, Kenya.

²Department of Plant Sciences, University of Cologne, Germany Corresponding Author: chepkemoiedinah49@gmail.com

ABSTRACT

Finger millet (Eleusine carocana L.) is a climate resilient cereal crop considered to be nutritionally rich with higher health benefits. However, there is limited information on the nutrients in Finger millet. Further, growing public awareness on nutrition and health care research substantiates the potential of finger millets as alternative crop. The objective of this study was to determine the macro and micro-nutrient profiles of 45 local and commercial varieties and new breeding lines from ICRISAT. Laboratory experiment was conducted at University of Cologne Germany in 2023. Complete randomized design with 4 replications was used. Inductively Coupled Plasma Mass Spectrometry (ICP-MS) analysis was used to determine the concentration of nutrients. Data was analyzed using Statistical analysis software and the treatment means separated using least significant difference at p≤0.05. The results showed that the highest content of macro nutrients P, K, Mg, Ca and S was 695.96, 1596.09, 435.47, 963.37 and 311.89 mg/100g for genotypes KAL ATARI, KNE 628, KAL ATARI, ICFX 1420314-6-5 and KNE 628, respectively. The micro nutrient element B, Mn, Fe, Cu, Zn, Mo and Al was found to range from 1.79-1.18, 4.38-46.80, 2.69-10.70, 0.03-1.12, 2.59-10.67, 0.09-0.20 and 0.12-48.09 mg/100gm respectively. The most nutrient dense genotypes were KNE 628, KNE 741, KNE628, KNE 741, KNE 628, ICFX 1320412-SB-5-1-4-1 and KACIMMI 72, respectively. These genotypes recorded high levels of both macro and micro nutrient elements. The study provided useful information on the potential health benefits of finger millets and the most nutritious genotypes that could be used for breeding to improve nutrient status of finger millet varieties in breeding programs.

Keywords: Breeding programs, finger millet, climate resilient cereal, nutrient dense, Inductively Coupled Plasma Mass Spectrometry (ICPMS)

Single Nucleotide Polymorphisms in selected candidate genes and their association with body weight in *Gallus Gallus Domesticus* ecotypes

¹Lochampa A., ¹Muasya, T. K., ²Ilatsia, E. and ³Ngeno, K.

¹Animal Breeding and Genomics Group, Department of Animal Science,
Egerton University, P.O Box 536-20115, Egerton, Kenya

²Dairy Research Institute, Kenya Agricultural and Livestock Research
Organization, P.O Box 25-20117, Naivasha, Kenya

³Animal Breeding and Genomics Group, Department of Agriculture & Natural
Resources, Moi University, P.O Box 3900-30100, Eldoret, Kenya
Corresponding Author: mikeamuge@gmail.com

ABSTRACT

Indigenous chickens (IC) are known for their variability in body weight. Genetic studies have shown that body weight is polygenic. A total of 234 IC belonging to six ecotypes were used to evaluate the effect of ecotype on bodyweight (BW) and to determine the association between BW and single nucleotide polymorphism (SNPs) involved in growth. Neuropeptide Y (NPY), Dopamine receptor D2 (DRD2), Bone morphogenetic receptor 1B (BMPR1B) and Melanocortin 1 receptor (Mel1C) genes from a diverse population of IC ecotypes were genotyped and the association between the generated SNP profiles and BW was investigated. . Body weights were recorded once, DNA was extracted from blood samples, GWAS performed using Mixed Linear Model. The results showed that average BW ranged from 0.6 to 2.60 kg. There were significance differences in BW between sexes (p<0.01) and ecotypes (p<0.05). The average BW was 1.38±0.32kg and 1.20±0.29kg for male and female chickens, respectively. The average BW was highest in SNNPR (1.39±0.07 kg) and Tigray (1.36±0.05kg) ecotypes. Different ecotypes had varied average BW of 1.26±0.03kg (Amhara). 1.13±0.01kg (Afar), 1.18±0.06kg (Gumuz) and 1.06±0.04kg (Oromia). Nine SNPs (NPY-3; SNP rs794226974, p-value=1.924; rs15938915, p-value=1.972 rs738097857, p-value =1.685); *Mel1C*-3 (SNP rs734475748, value=3.219, SNP rs317836677, p-value=2.92 and SNP rs315819466, pvalue=2.92), DRD2-2 (SNP rs313898728, p-value=2.28 and SNP rs732873238, p-value=2.166) and BMPR1B-1 (rs13524270) were associated with BW. The results indicate that SNPs on BMPR1B, NPY, DRD2 and Mel1C genes are associated with the BW trait and are potential markers for use in molecular marker-assisted selection programs.

Keywords: Candidate genes, genomic selection, GWAS, QTLs

Antibacterial potency of *Pelargonium zonale* and *Psidium*guajava against bacterial wilt of potato under greenhouse condition

*¹Okeyo, G. O., ¹Charimbu, M. K., ¹Nyaanga, J. G. and ²Mendes, T.
¹Department of Crops, Horticulture and Soil Sciences, Egerton University,
Njoro, Kenya; ²The CGIAR Research Program on Roots, Tubers and Bananas
(RTB), International Potato Center, Sub-Saharan Africa Regional Office, ILRI
Campus, Nairobi, Kenya

Corresponding Author: ogidraf@gmail.com

ABSTRACT

Pelargonium zonale and Psidium quajava plant extracts have demonstrated in-vitro antibacterial activity against Ralstonia pseudosolanacearum sp. nov. Nevertheless, their antibacterial effectiveness against this disease has not been examined under greenhouse condition. This study explored the antibacterial efficacy of ethanolic leave extracts of P. zonale and P. quajava in management of R. pseudosolanacearum sp. nov. of potatoes under greenhouse condition. The experiment was set in a completely randomized design (CRD) of 2*6 factorial arrangements [2 varieties (Shangi (Highly susceptible) and Sherekea (Moderately resistant) and 6 treatments] with 3 replicates. The treatments comprised; 2 ethanolic leave extracts (P. quajava and P. zonale) at 50 mg/mL, 2 positive controls [ENRICH BM (Bronopol 27%w/w) and KOBE 1.2 SL (Chrysophanol 12g/l)] at commercial rates and 2 negative controls (Untreated control and 1% DMSO). The soil media was inoculated with 10 mL of bacterial suspension adjusted to 600 nm OD (approximately 10⁷ to 10⁸ cfu/mL) per pot. Data was collected on disease incidence, disease severity, plant heights, number of stems, yield (Kgs) and number of bacterial wilt colony counts. The study results revealed that all the treated plants exhibited significantly low disease incidences, low area under disease progress curves (AUDPCs), high number of stems, high stem heights, low bacterial wilt colony counts and high yield (Kgs) compared to negative controls. Potato variety Sherekea exhibited the highest average efficacy from the two plant extracts; 0.14 for disease incidence, 1178.21 for AUDPC, 1.84 for stem height, 2.66 for bacterial wilt colony counts and 0.28 for yield (Kgs) respectively. These results demonstrated the synergistic effect of host plant resistance and/or tolerance and botanicals in management of R. pseudosolanacearum sp. nov. Further research is required to determine the effectiveness and stability of the two extracts against the target pathogen in

the field to enhance their adoption and commercialization in the management of bacterial wilt pathogen in infested potato production fields.

Keywords: Antibacterial, In-vivo, Pelargonium zonale, Psidium guajava

Physico-chemical changes during growth and development of tomato (Solanum lycopersicum L.) fruits

*1,2 Ahmed, A. A. A., 3,4 Mohammed, E. A. H. and 2 Abu-Goukh, A. A.

Agricultural Research Corporation, Horticultural Research Center, Khartoum North, Sudan; 2 University of Khartoum, Faculty of Agriculture, Department of Horticulture, Khartoum North, Sudan

³University of Debrecen, Faculty of Agric., Food and Science and Envi.
Management, Dept. of Animal Science, Hungary

⁴Agricultural Research Corporation, Integrated Pest Management Research
Center, Wadmadani, P.O. Box 126, Sudan

*Corresponding Author: abdallamangobest@gmail.com

ABSTRACT

The study aimed to investigate the physical and chemical properties of two tomato cultivars namely: Joude1F1 and Amani1F1 during the growth and development of fruits to determine the appropriate harvesting time. Seventyfive plants were selected and tagged from each cultivar then fruit samples were collected at different growing stages. The first samples were picked two weeks after anthesis (2WAA) and the sampling continued every two weeks up to the over-ripe stage (12 WAA). Flesh fruit weight, volume, length, diameter, respiration rate (RR), Treatable acidity content (TAC), Ascorbic acid (AA) and laycopen pigment were measured regularly from 2WAA to 8WAA. The results showed that fresh weight significantly (p > 0.05) increased in both cultivars at 4WAA and 8WAA comparing to other harvesting periods. RR decreased from 85.4 and 72.8 mg CO₂/kg-hr at 2 WAA to 28.7 and 24.7 mg CO₂/kg-hr in Joude 1F₁ and Amani 1F₁, respectively, and then increased to 45.4 and 32.7 mg CO₂/kg-hr and then decreased afterward to 19.9 and 8.0 mg CO₂/kg-hr at the canning - ripe stage in Joude 1F₁ and Amani 1F₁, respectively. Additionally, TAC increased from 0.21% and 0.37 % at 2 WAA to 0.53 (6 WAA) and 0.64% (8WAA) in Joude 1F₁ and Amani 1F₁, respectively, and then decreased to 0.26 and 0.50 % at the canning - ripe stage in Joude 1F1 and Amani 1F1, respectively. Furthermore, AA content was increased from 10.8 and 12.5 mg/100g at 2WAA to 27.08 mg/100g at 8 WAA and decreased from 18.9 and 20 mg/100g at the canning-ripe stage (12 WAA) in Joude 1F1 and Amani 1F1 respectively. In conclusion, the optimal time for harvesting tomato fruits in Joude 1F1 and Amani 1F1 is at 8 weeks after anthesis (8WAA) when the fresh weight, volume, and dimensions (length and diameter) of the fruit attain their maximum levels.

Keywords: Amani1F1, Joude1F1, growth and development, physic-chemical changes

Factors influencing the use of digital technologies in the marketing of green leafy vegetables among smallholder farmers in Lari Sub-County, Kenya

*1Molapo, M. E., 2Mshenga, P. and 3Mathenge, M.
Department of Agricultural Economics and Agribusiness Management,
Egerton University, Kenya
Corresponding Author: moltamolapo@gmail.com

ABSTRACT

Smallholder farmers in emerging economies have long faced information asymmetry difficulties. To this day, the bulk of agricultural-related information is still conveyed by word of mouth, extension workers, or traditional Nonetheless, information strategies. such released irregularly and for a limited number of markets, leaving the vast majority ignored. As a result, market information becomes available to fewer individuals. Farmers decide to sell their produce through middlemen at relatively low prices, resulting in insufficient profits. Numerous studies have shown that digital technologies in agriculture are an important tool for farmers to be active participants in profitable markets by improving their access to timely and relevant market information. Despite the rapid expansion of digital technology in emerging nations' agricultural sectors, adoption of such technologies in rural areas remains low. The purpose of this study was to identify the characteristics that influence smallholder farmers' usage of digital technology in the selling of green leafy vegetables in Lari sub-County, Kenya. The study specifically attempted to determine the socioeconomic, institutional, and technological factors that influence smallholder farmers' usage of digital technology. A descriptive survey research design was used. A multistage sampling procedure was used to select 376 green leafy vegetable farmers. The semi-structured questionnaire was employed to collect data. A multivariate probit model was used to analyze the data. The results show that years of education positively influenced the use of social media in marketing. household size positively influenced the use of mobile phones and social media, and access to electricity positively influenced the use of mobile phones and the internet. Age had a negative influence on the use of the Internet in the marketing of green leafy vegetables. The adoption of digital technologies in the marketing of vegetables can be influenced by several factors. Therefore, the County Government through extension officers can provide training and education to smallholder farmers on how to use digital technologies effectively for marketing.

Keywords: Agricultural, information, mobile phone, internet, socioeconomic, social media

Induction of flowering in cassava brown streak resistant clones using plant growth regulators, pruning and extended photoperiod through night-breaks

*1,2*Obare, I., *Charimbu, M. K., *Mafurah, J., *Woyengo, V. W., *Okech, R., *Abour, A., *Mutoni, C. K., *Ferguson, M. E., *Tripathi L. and *.5*Kariuki, S. M.

1,2*Kenya Plant Health Inspectorate Service, *Egerton University, *Kenya Agricultural and Livestock Research Organization (KALRO) Kakamega *International Institute of Tropical Agriculture-Nairobi, *Department of Plant Sciences, Kenyatta University

*Correspondence Author: ijuma005@gmail.com

ABSTRACT

Cassava is utilized as a food security crop in Kenya. Its production is affected by biotic and abiotic factors such as the viral disease, cassava brown streak disease (CBSD). The challenge requires urgent breeding interventions. Cassava breeding is hampered by poor and asynchronous flowering. The aim of this study was to induce and enhance flowering in CBSD immune and resistant cassava clones with variable flowering characteristics. The study was set as two experiments at Kenya Agricultural and Livestock Research Organization (KALRO), Thika. First experiment testing a combination of plant growth regulators and pruning, laid out in a randomized complete block design (RCBD) with four replicates. Second experiment testing the effects of extended photoperiod on flowering, set in RCBD with twelve replicates. In this experiment, 100W white LED lights were used to extend photoperiod by breaking nights for three hours. In the first experiment, treatment resulted in a significant ($p \le 0.001$) increase in the number of female flowers, number of fruits, and number of seeds. However, the treatment did not reduce days to flowering and height to first branching. In the second experiment, night break significantly increased (p \leq 0.001) the number of female flowers, number of fruits, wet shoot weight while reducing the days to flowering, height to first branching, and number of nodes to first branching. These results offers solution to the poor flowering in different cassava clones through a combination of PGRs, pruning and extending photoperiod. Approaches tested here can be readily deployed in accelerating cassava breeding and contribute to improved food security.

Keywords: Flowering, induction, nightbreaks, plant growth regulators and pruning

Technological properties of improved pigeon pea varieties in Machakos County

*1Ababu, V., 2Waswa, L. and 1Ngoda, P.

1Department of Food Science, Egerton University,
P. O. Box 536-20115, Egerton

2Department of Human Nutrition, Egerton University; 254703404458

Corresponding Author: ababuvictor2014@gmail.com

ABSTRACT

Pigeon peas, a type of pulse, hold immense potential to improve the health and nutrition of people in arid and semi-arid lands. Unlocking this potential depends heavily on understanding their technological properties. These properties, such as hydration rate, volumetric expansion, and cooking time, directly influence processing and ultimately determine the accessibility and acceptability of pigeon peas as a food source. However, there is limited information on technological properties of improved varieties. The study aimed to determine technological properties of improved pigeon pea varieties grown in Machakos County. Seven improved and one advanced pigeon pea varieties were sourced from KALRO Katumani (KARI Mbaazi 1, KARI Mbaazi 2, Mituki, KAT /60/8 and ICEAP 00850) and Egerton University (Egerton Mbaazi 1. Egerton Mbaazi 2 and advanced variety (ICEAP 00554)). These varieties were tested for water absorption, volumetric expansion, density, cooking time and total soluble solids in the broth. The experiment was arranged in a Completely Randomized Design (CRD) replicated three times. Data analysis was conducted using SAS software version 9.1.3 (SAS, 2006). Means separation was done using Tukey's honestly significant difference (HSD) at 95% Confidence Level. There were significant differences in water absorption, volumetric expansion, density, total soluble solids and cooking time among the improved varieties (p<0.05). Cooking time in minutes was shortest for Mituki (46.0) and KAT 60/8 (55.7) and longest for KARI Mbaazi 1 and ICEAP00850 (160.0). All the varieties showed high total soluble solids ranging from 10.5 to 26.7% that indicates potential to select varieties with desired flavour profiles. Improved pigeon pea varieties (Mituki and KAT60/8) displayed desired technological properties alongside the advanced variety ICEAP 00554. These findings inform the specific culinary applications and nutritional needs which enhance utilisation of pigeon peas as food. Further research is needed to determine the impact of the technological properties on the digestibility and glycaemic index of pigeon peas.

Keywords: Pigeon peas, improved variety, technological.

Influence of a shared learning platform on participation on potato multiplication among small scale farmers in Kamara Ward

*1Bundi, D. N., 2Nkurumwah, A. O. and 2Munyua, C. N.

¹Department of Agriculture Education Extension, Egerton University Kenya ²Department of Agriculture and Human Ecology, Egerton University Kenya

Corresponding Author: dorcasnyabeta@gmail.com

ABSTRACT

Food security remains a challenge in Sub Saharan Africa and has been attributed to several factors among them, low productivity of agricultural resources. Investments in agricultural research and technology are required to bring about change in productivity for food security. Innovation platforms have been used as vehicles in agricultural research for development. Potato (solanum tuberosum) is a staple food second after maize in Nakuru County. Although potato is predominantly grown by small scale farmers, they have limited access to quality seed potato. They are not participating in seed potato multiplication due to limited knowledge and skills and their farms are below the minimum requirement of 5 acres by KEPHIS. The research was designed as a descriptive survey using participatory action research methodologies in which baseline data was collected and analyzed. The action plan as the intervention which was the Shared Learning Platform (SLP) was done. The end line data was collected and analyzed again to establish the change. The target population consisted of all small - scale potato farmers and key informants in the seed potato value chain in Nakuru County The accessible population was potato small scale farmers from Kamara Ward Kuresoi North Sub County Kenya. The Key Informants (KI)were from Kuresoi North and Molo Sub Counties of Kenya. Random sampling was used to select 120 small scale potato farmers from Kamara Ward, 10 key informants for the baseline survey. Forty small scale farmers were purposively selected from those who participated in the baseline survey for the action plan (SLP). Data was collected on the farmer's knowledge and skills on seed potato multiplication before, during and after the intervention. Statistics Data Analysis (STATA) version 13 was used to analyze descriptive data. Thematic content analysis was used to analyze themes from FGDs, T-test, Chi square, ANOVA analysis and a regression were run to test the relationship between the outcomes and the intervention. From the baseline it was found that that

SSFs experience complex problems that required all stakeholders in SPM and that the solution was the SLP. The SSFs who participated in the SLP gained from group formation and 10 SSFs each 1acre for seed potato multiplication. This acreage enabled them to participate in SPM as they donated more than 10 acres. There was increased knowledge and skills gained in SPM from the SLP which led to improved participation, establishing networks in the SLP were ADC Molo agreed to provide farm inputs and market for seed potatoes for the SSFs. This could enhance increased availability and accessibility of seed potato and increased incomes. This could also enhance dissemination of knowledge and skills on seed potato multiplication among SSFs and use of shared learning platform by small scale seed potato farmers.

Keywords: Knowledge, participation, platform, shared learning, small scale farmers

The effect of cooking on nutritional characteristics of biofortified common beans (*Phaseolus vulgaris*) in Burundi

¹Muroki, M. W., ²Waswa, L. M., ^{3,4}Fungo, R., ⁵Kabwama, A., ⁶Nduwarugira E., ⁶Nepomuscene, N. and ¹Mahungu, S. M.

¹Department of Dairy, Food Science and Technology, Egerton University, Nakuru, Kenya.

²Department of Human Nutrition, Egerton University, Nakuru, Kenya.

³Alliance of Bioversity International and International Centre for Tropical Agriculture (CIAT), Nairobi Kenya.

⁴School of Food Technology, Nutrition, and Bio-Engineering, Makerere University, Kampala, Uganda.

⁵Alliance of Bioversity International and International Centre for Tropical Agriculture (CIAT), Kampala, Uganda.

⁶ Institut des Science Agronomiques du Burundi (ISABU), Bujumbura, Burundi

Corresponding Author: marywambuimuroki@gmail.com

ABSTRACT

The study was conducted at the Guildford Dairy Institute, Department of Dairy, Food Science and Technology, Egerton University. The aim was to determine the effect of cooking on the proximate composition, anti-nutrient and minerals content of ten biofortified common bean from Burundi with varieties with variety Rusenyanzego and Kinure acting as controls. Standard methods were used to conduct analyses in the raw and cooked varieties. Cooking increased the protein content of Kinure, NUV30, NUV91, RWV1129 and Rusenyanzego. The fibre content of all varieties increased after cooking. There was a significant reduction in carbohydrate content in all biofortified bean varieties after cooking except for RWR2245. Cooking increased the fat content of all bean varieties except for NUV91 but reduced the condensed tannin content in all biofortified bean varieties. Cooking did not affect the phytic acid level in NUV91 (20.53 mg/100g) bean variety. There was a reduction in total phenolics content in varieties NUV30, RWR215 and RWV1129. Mineral concentration varied within the varieties. Cooking caused loss of Fe in RWR2154 (9.3%), NUV130 (71.3%), MAC70 (27.1%) and RWV1272 (26.7%) biofortified varieties but increased Fe concentration in RWV1129 variety by 68%. The Zn content other varieties but reduced by 12.4% in MAC70. Ca content decreased in NUV130. RWV1272 and MAC44 by 28.2%. 15.8% and 3.1% respectively. Conclusively, the cooking process either reduced or increased the nutrient and antinutrient factors in the common bean

varieties hence impacting their nutritional composition. These varieties can be consumed and considerably alleviate malnutrition particularly in developing countries.

Keywords: Antinutrients, cooking, minerals, nutritional value, proximate

Determinants of utilization of banana value addition among small-scale agripreneurs in Kenya: A case of Kisii County

¹Ntabo, A, ²Muange, E. N. and ¹Okello, D. O.

Department of Agricultural Economics and Agribusiness Management,
Egerton University, Njoro, Kenya
Department of Agricultural Sciences, Machakos University,
Machakos, Kenya,

Corresponding Author: agnesntabo96@gmail.com

ABSTRACT

There is increased demand of banana fruit and its processed products among the rural and urban population. Value addition reduces postharvest losses and increases crop productivity as well as crop income. Even though, the government and non-governmental organization s have promoted banana value addition, its utilization is still low in Kisii county Kenya. There is a dearth of information on the determinants of utilization of banana value addition. Previous studies on determinants of crop value addition, have focused on tomatoes, mangoes, tubers and root crops, with little emphasis on banana fruit. This necessitated the study. Mult-stage sampling procedure was used to select 201 respondents. Data were collected using semi-structured questionnaires and analysed using descriptive, inferential statistics and a Cragg's Double Hurdle model. The results revealed that banana value adders were involved in flour milling (36%) slicing and drying (31%) cleaning sorting and grading (26%) and crisps making (7%). Compared to non-value adders, value adders were significantly younger, produced more quantities of bananas, travelled longer distances to the market, received more trainings and extension visits, practiced farming as their main occupation, owned smaller farm sizes and majority of them did not access credit The decision to utilize banana value addition was significantly influenced by the total quantity of banana produced, type of roads, primary occupation, number of trainings and extension contacts, distance to output market, group membership, and access to credit. The extent of value addition was influenced by extension contacts, type of roads, total quantity of banana produced, and marital status (being married). The study recommends that the socioeconomic and institution factors influencing both decision and extent of banana value addition should be considered when formulating and implementing policies geared words promoting banana value addition.

Keywords: Agripreneurs, Banana, Double hurdle, Utilization, Value addition

Knowledge, attitude and practices of antimicrobials in dairy herds in Nakuru Peri-Urban Area, Kenya

¹Njie, M., ¹Bebe O. B. and ²Orenge O. C.

¹Department of Animal Science, Egerton University ²Veterinary Medicine Department, Egerton University **Corresponding Author:** m21411012n@gmail.com

ABSTRACT

High prevalence of mastitis infections induces frequent use of antimicrobials Antimicrobial Use (AMU) and this poses public health risks and potential economic losses. This justifies developing stewardship programs for Antimicrobial Resistance (AMR) that is informed by Knowledge Attitude and Practices (KAPs) about the AMU. This study explored the KAPs about AMU in different production systems of smallholder dairy farmers in four peri-urban wards of Nakuru city in Kenya. In a cross-sectional survey with a questionnaire, a random of 124 farmers provided data on KAPs. The data was subjected to chi-square statistics to establish associations between the KAPs and AMU. Results revealed that seven in ten (68.5%) farmers used Antimicrobial Drug (AMD) and four in ten (34.7%) used the drugs for treatment. Eight in ten (75%) farmers were knowledgeable of antimicrobial residues and development of AMR, regardless of the production system (p>0.05) they practiced. An exception was the use of milk from treated cows before the withdrawal period (p<0.05). Six in ten (54.8%) farmers agreed that mastitis can be treated without use of AMD while seven in ten (62.9%) held that lactating cows can be treated with any type of AMD. Those who disagreed that human health risks can be attributed to consuming milk from antimicrobial treated cows before the withdrawal period were fewer (three in ten; 28.2%). Majority of the farmers used AMD that were prescribed (81.5%), purchased over the counters without prescription (82.3%) or selfadministered (75.0%) on the advice of extension and veterinary officers. Compliance was high with the recommended withdrawal period (87.9%) and follow-up treatments (75.8%), but purposive use of human drugs on livestock was alarmingly high (62.9%). These results suggest further need for more targeted training and sensitization of farmers on the prudent AMU, antimicrobial residue accumulation and subsequent risk of AMR in both animal and human health.

Keywords: Antimicrobial resistance, antimicrobial use, Kenya, knowledge attitude and practices, mastitis,

Levels of milk yield associated with different cow drying-off practices deployed by Nakuru peri-Urban smallholder dairy farmers

Sonko, L., Bebe B. O. and J. Ondiek
Department of Animal Science, Egerton University
Corresponding Author: lansonko4@gmail.com

ABSTRACT

Production intensification in smallholder peri-urban dairy farms shows an inclination toward high-yielding cows but how they manage the drying-off period is a knowledge gap that this study aims to fill. Cow drying-off practices among high yielders can impact cow productivity, health, welfare and fertility in successive lactation if poorly implemented. This study was a cross-sectional observational survey of cows with successive lactations to establish the length of drying-off, drying-off practices and the levels of milk yield associated with different cow drying-off practices deployed on smallholder dairy farms around the Nakuru peri-urban. A total of 87 sample farms were visited of which 174 cows with successive lactations were examined. Of these 174 cows, the drying-off practices most frequently deployed were complete stopping of milking and gradual reduction of milking (each 30.5 %; 53/174). However, milk yield at the start of drying-off differed (p<0.05) with the drying-off practice, being 6.975 litres/day when complete stopping of milking and 4.042 litres/day when gradual reduction of milking was practised. Dry cow therapy was less practised (4.6%: 8/174) and milk yield averaged 6.625 litres/day. Cows that died off by 60 days before the calving date were more (64.9%: 113/174) than those dried off after 60 days (35.1%: 61/174). The results are relevant to the choice of appropriate cow drying-off management practices that optimize cow productivity and incomes in peri-urban smallholder dairy herds.

Keywords: Dairy, milk yield, peri-urban, smallholder farmers, Nakuru

Camel herd structure and performance in Isiolo and Marsabit Counties, Kenya

^{1,2}Thiakunu, F., ³Njehia, B. K., ²Nguhiu, P. N., M. and ⁴Arimi J.
¹Department of Animal Science, Kenyatta University, Kenya, ²Department of Animal Science, Meru University of Science and Technology, Kenya
³Department of Agricultural Economics, Kenyatta University, Kenya Kenya, ⁴Department of Food Science, Meru University of Science and Technology, Kenya

Corresponding Author: karimithiakunu@gmail.com.

ABSTRACT

Urbanization and improved middle-level class income have caused an increase in demand for animal products and allowed economic growth in developing countries. Arid and semi-arid lands (ASALs), which support high livestock population have an opportunity to contribute to the economy. However, their potential may not be realized fully due to the effects of climate change. This study aimed to establish camel herd structure and performance in Isiolo and Marsabit Counties, Kenya. Focus Group Discussions (FGDs) and a crosssectional study were conducted from July to August 2022 in each County. Data on the herd size and composition (the number of age and sex categories) was collected from 388 households through structured questionnaires. The pregnancy test was done on seventeen camels four months after the mating season by tail cocking and progesterone assay method. Analysis was done using descriptive, correlations, and linear regression statistics at a 0.05 significance level. There were more female camels over 4 years in Isiolo (above 12%) than in Marsabit (below 10%). In Isiolo, milk yield was above 20 and 10 liters per day in wet and dry seasons respectively, while Marsabit production was below 10 liters in both seasons. Milk production coefficients were significant for the females above four years (p < 0.05). There were more households in Marsabit (63%) with camels having a calving interval of 24 months and below than in Isiolo (50%). The tail cocking method did not correlate with the progesterone assay method in pregnancy diagnosis. The study concludes that, in Isiolo County, pastoralists are doing camel rearing with the objective of milk production unlike in Marsabit County. The recommendation is that pastoralists should be encouraged to adjust age and sex categories to increase milk production. Further, they need to apply an accurate cost-effective pregnancy testing method.

Keywords: Herd size, male-female ratio, performance, tail cocking, progesterone assay

15TH BIENNIAL INTERNATIONAL CONFERENCE Genetic parameters for growth traits of the n'dama cattle in the Gambia

*1,3Nyabally, K., ²Okeno, T. O. and ¹Muasya, T. K.

¹Animal Breeding and Genomic Group, Department of Animal Science, Egerton University, PO Box 536-20115-Egerton, Kenya

²Centre of Excellence for Livestock Innovation and Business, Egerton University, PO Box 536-20115-Egerton, Kenya

³West African Livestock Innovation Centre, Banjul, the Gambia

⁴Department of Livestock Services, Abuko Complex, the Gambia

*Corresponding Author: nyaballykebba94@gmail.com

ABSTRACT

The N'dama cattle are adapted to poor-quality feed resources and tsetseinfested (both Glossina palpalis gambiensis and Glossina morsitans submorsitans species) areas in the West African region, including The Gambia. The breed can therefore contribute significantly to the livelihoods of resourcelimited households. Genetic variance is a key prerequisite for sustainable genetic improvement in a population. In beef cattle, maternal genetic effects play an important role in the growth and survival of calves. These effects stem from the genetic contribution of the dam and can significantly impact the traits of economic importance such as reproductive traits which include calving interval, age at weaning, and fertility. It also has a direct impact on growth rate, calf performance, and maternal care. Focusing on maternal genetics and its effects on traits related to reproduction, maternal care, and calf performance can enhance the overall efficiency and productivity of cattle herds. Previous studies that estimated genetic parameters did not consider maternal genetic effects for early growth traits. The objective of this study was therefore to estimate genetic co-variance components and parameters for growth traits along the growth curve in the N'dama cattle in the Gambia. A total of 5,173, 3,130, 2,488, 2,422, 2,442, 1,471, 1,934, and 1,452 records for birth weight (BW) weight at 7 months (WT7), 12 months (WT12), 16 months (WT16), 18 months (WT18), 24 months (WT24), 36 months (WT36) and 50 months (WT50), were used for analysis. The effect of fixed factors and least square means were estimated using a general linear model of the Statistical Analysis System (SAS 2004) fitting herd-year-season of birth and sex as fixed 27

effects while the age of the dam at calving was fitted as a linear covariate. Variance-covariance components were estimated by fitting a univariate animal model to each trait in an average information-restricted maximum likelihood (AI-REML) procedure. Least square means and associated standard errors for BW, WT7, WT12, WT16, WT18, WT24, WT36 and WT50 were 51.76±0.21kg, 75.08±0.37kg, 90.04±0.44kg, 16.93±0.04kg, 123.80±0.52kg, 149.90±0.73kg and 190.37±0.68kg, respectively. The corresponding genetic variances for BW, WT7, WT12, WT16, WT18, WT24, WT36 and WT50 were 1.7kg², 66.19 kg², 114.15 kg², 121.57 kg², 132.78 kg², 59.06 kg², 148.84kg², and 168.03 kg². Maternal genetic variances for BW and WT7 were 0.63 kg² and 25.64 kg², respectively. The respective direct heritability estimates were 0.30±0.04, 0.51±0.06, 0.47±0.05, 0.39±0.05, 0.36±0.05, 0.22±0.07, 0.31±0.06 and 0.31±0.06. Maternal heritability estimates for BW and WT7 were 0.11±0.02 and 0.20±0.04, respectively. Body weight at month 7 (WT7) had the highest heritability estimate (0.51±0.06) while body weight at 24 months had the lowest (0.22±0.07) heritability estimate. The results indicate that direct heritability estimates for body weight at different ages were moderate to high. Maternal genetic effects influenced BW and WT7. The study revealed that bodyweight at the 7th month (WT7) had the highest direct and maternal heritability estimate among the traits considered. Therefore, if the goal is to achieve the highest genetic response through selection, emphasis on body weight at 7 months and focusing on both direct and maternal genetic effects would yield the highest genetic gain.

Keywords: African *Bos taurus*, beef cattle, genetic improvement, rate of gain

Valorizing potato peels wastes into a bioactive compounds peel extract in Rwanda

Hagenimana, T. Corresponding Author: hagenatheos2006@gmail.com

ABSTRACT

Potato is a global crop for food and nutrition security. Processing of potatoes generates a large quantity of potato peels: a potato by-product containing a higher amount of bioactive compounds than potato flesh. Potato peels can be processed to extract bioactive compounds, which may vary with potato cultivar and extraction method. While potato peels produce beneficial bioactive compounds for human health and industrial applications, they are generally disposed of as waste in Rwanda. The aim of this study was to assess the effects of potato variety and extraction method on yield of phenolic compounds and glycoalkaloids of potato peel extracts in Rwanda. The study used potato tubers from five potato cultivars, namely Kningi, Peco, Kuruseke, Kirundo and T58, and two extraction methods: decoction and indirect ultrasound assisted. For each potato cultivar, peels of 10 kg of each potato cultivar were processed into potato peel extracts. The extracts were analyzed for their content in total glycolakaloids (TGA), total phenolics (TPC), total flavonoids (TFC), and total anthocyanins (TAC). Data in concentration of bioactive compounds was subjected to two factor ANOVA (p < 0.05) to determine the influence of potato cultivars and extraction methods. Results showed that potato peel extracts contain bioactive compounds with ranges of 0.97-11.83 mg SE/100g in TGA, 356.80-585.58 mg GAE/100g in TPC, 3.60-8.56 mg QE/g in TFC, and 3.28-5.74 mg CGE/100g in TAC. The composition of bioactive compounds varied with and was significantly (p< 0.0001) affected by both potato cultivar and extraction method. Kuruseke cultivar was the lowest and Kinigi the highest in TGA, while Kirundo was the lowest and Kuruseke the highest in phenolic compounds. The indirect ultra-sound assisted extraction method produced higher levels of phenolic compounds compared to the decoction method. Kuruseke cultivar coupled with the indirect ultra-soundassisted extraction method emerged as the recommendable choice to extract bioactive compounds from potato peels in Rwanda.

Keywords: Bioactive compounds, decoction, indirect, potato peels extracts, ultra-sound assisted, Rwanda

Carcass characteristics and sensory quality of broilers fed on extruded sorghum [Sorghum bicolor (L.) Moench] meal and exogenous phytase-based diets

*Mutinda, V. M. King'ori, A. M. and Ambula, M. K.

Department of Animal Sciences, Faculty of Agriculture, Egerton University, P.O. Box 536- 20115, Egerton, Kenya

*Corresponding Author: victormutinda497@gmail.com

ABSTRACT

The interest in alternative energy sources in diets for sustainable poultry production is increasing. However, there is inadequate information on their effect on broiler production in terms of growth performance and meat quality. This study investigated the effect of extruded sorghum meal (ESM) and exogenous phytase enzyme on broiler carcass characteristics and descriptive sensory quality. A total of 108 day-old Cobb 500® chicks were weighed, grouped in six and randomly placed in deep litter cages. Each cage was randomly assigned one of the six dietary treatments with three replicates: T1 (0% ESM + 0% phytase), T2 (0% ESM + 0.035% phytase), T3 (50% ESM + 0% phytase), T4 (50% ESM + 0.035% phytase), T5 (100% ESM + 0% phytase), and T6 (100% ESM + 0.035% phytase). The grower and finisher diets were offered from days 1-21 and 22-42, respectively. After day 42, all broilers were weighed, and three randomly sampled from each treatment for carcass characteristics and descriptive sensory quality. The carcass weights and the weights of carcass parts were expressed as a percentage of live weight. A total of 10-12 panellists rated the sensory attributes of the meat on a quantitative descriptive analysis scale and just-about-right scale. Data was subjected to two-way analysis of variance in a completely randomized design using the general linear model procedure of the SAS Institute Inc. (version 9.4; 2015). Mean separation was done using Tukey's HSD test at 0.05 level of significance. Results showed that inclusion of ESM above 50% in the diets reduced carcass weights, abdominal fat, and gizzard weight. All sensory attributes were satisfactory. The inclusion of ESM up to 50% and exogenous phytase enzyme did not affect carcass characteristics or descriptive sensory quality. Thus, ESM may be included up to 50% with exogenous phytase enzyme in broiler diets without adversely affecting broiler carcass characteristics and descriptive sensory quality.

Keywords: Descriptive, dressing percentage, gizzard, juiciness, tenderness

Biostimulating effects of *Bacillus simplex* on the photochemical yield and grain yield of maize under surface drip irrigation

*1,2 Ocwa, A, ¹Illes, A, ¹Bojtor C, ^{1,3}Ssemugenze, B and ^{1,4}Harsanyi, E

¹Institute of Land Use, Engineering and Precision Farming Technology, Faculty of Agricultural and Food Sciences and Environmental Management, University of Debrecen, 138 Böszörményi street,

4032, Debrecen, Hungary.

²Department of Agriculture Production, Faculty of Agriculture, Kyambogo University P.O. Box 1, Kyambogo, Kampala, Uganda; ³Faculty of Agriculture, Uganda Martyrs University

P.O. Box 5498, Kampala, Uganda.

⁴Institutes for Agricultural Research and Educational Farm, University of Debrecen, Böszörményi 138, 4032 Debrecen, Hungary.

*Corresponding Author: ocwa.akasairi@agr.unideb.hu

ABSTRACT

Maintaining soil productivity under changing climate remains one of the key impediments to maize production. Among the ecological measures, include utilization of growth promoting bacteria such as Bacillus. Therefore, the objective of this study was to determine biostimulating effects of Bacillus simplex on the photochemical yield and grain yield of maize under surface drip irrigation. The field experiment laid out in a randomized completed block design was conducted in 2022 in Eastern Hungary. Maize seeds inoculated with Bacillus simplex and the control (negative) were the treatments. The field was supplied with water using surface drip irrigation system. Data on chlorophyll fluorescence parameters at vegetative and reproductive stages, and yield was collected. Results revealed no significant (p>0.05) differences on chlorophyll fluorescence parameters and yield between Bacillus simplex and the control. Photochemical efficiency of photosystem II (PSII) under Bacillus simplex was 0.77 compared to 0.75 in the control. The electron transport rate under Bacillus simplex was 38.55 compared 37.57 in the control. Accordingly, the grain yield under *Bacillus simplex* was 14.69 t. ha⁻¹ compared to 11.57 t. ha⁻¹ in the control, signifying 3.12 t. ha⁻¹ (26.97%) improvement. Slight yield improvement shows the positive effect of Bacillus simplex. However, trials under different soil moisture and fertility conditions are required to verify the ability of Bacillus simplex to significantly optimize yield.

Keywords: Bacillus, chlorophyll fluorescence, grain yield, photochemical yield

Sustainable and safe food systems, biotechnology and climatesmart agriculture microelement concentrations in baobab leaves from Sudan: Implications for human nutrition

^{1,2},Ahmed, A. E. M., ³Mozzon, M., ¹Shaikh, A. M., ^{4,5}Mohammed, E. A. H. and ¹Kovács, B.

¹Faculty of Agriculture and Food Sciences and Environment Management, Institute of Food Science, University of Debrecen, Hungary; ²Faculty of Forestry, University of Khartoum, Postal Code 13314, Khartoum North, Sudan; ³Department of Agricultural, Food and Environmental Sciences, Università Politecnica delle Marche, Italy

⁴Faculty of Agriculture and Food Sciences and Environmental Management,
Department of Animal Science, Debrecen, Hungary

⁵Agriculture Research Corporation (ARC), Crop protection Research Center, Wadmadani, Sudan. +36202889031

Corresponding Author: ahmed.abdelhakam@agr.unideb.hu

ABSTRACT

The African baobab Adansonia digitata L. is an iconic tree native to the African continent, renowned for its nutrient significance. In Sudan, the nutritional potential of its leaves remains largely unexplored. This study presents a comprehensive analysis of microelement concentrations in baobab leaves collected from diverse geographical locations in Sudan. The leaf samples were collected from three various site types - Wetland (W), Plain land (P), and Mountain (M) in Sudan. Inductively Coupled Plasma Mass Spectrometry (ICP-MS) was used for the analysis of elements such as Copper (Cu), Iron (Fe), Manganese (Mn), and Zinc (Zn). One-way analysis of variance (ANOVA) was used to ascertain the influence of site types on elemental content at a 5% significance level. Fe was highest in site M (36 mg/100 g), while Mn was highest in site P (7.8 mg/100 g). Copper and zinc exhibited variations across the different sites and the highest mean concentration for both was observed in site W (1.0 mg/100 g) and (2.4 mg/100 g) respectively. The results revealed significant variations in microelement concentrations based on site type. These outcomes provide valuable insights into the nutritional composition of baobab leaves, indicating the potential applications in human dietary practices and supplementation strategies. Overall, this study contributes to understanding the nutritional value of baobab leaves in Sudan, with implications for human health and food security.

Keywords: Baobab leaves, food security, nutrient

Performance of honeybees (Apis mellifera) supplemented with soybean, chickpea and ground prosopis juliflora pod meal during dearth period

¹Masai, H. J., ²Ambula, M. K., ³King'ori. A. M.

Department of Animal Science, Egerton University, P.O. Box 536-20115, Egerton, Kenya. Telephone: (254) 722-385-143 Corresponding Author: masaijumah@gmail.com

ABSTRACT

This study investigated the effect of dietary supplementation on the development and strength of bee colonies and honey production especially during the dearth period in Marigat, Baringo County, Kenya. One experiment determined the proximate composition of the feed ingredients. There were four dietary treatments: T1 (control); T2 (soybean flour), T3 (chickpea flour), and T4 (ground Prosopis juliflora pods. The feeding trial was conducted in a dearth period, April to July 2023. In a completely randomized design, twelve wooden Langstroth hives of similar colony strength, randomly selected and labeled (numbered). Each hive received 250g of the specific dietary treatment weekly for thirteen consecutive weeks using the top bar feeding technique. Data collected included the acceptability of the diet, sealed brood area of hives/cm², population density, and honey yield (kg), measured every one week, three weeks, and four weeks, respectively whereas honey was harvested after the experiment. Data was analyzed using statistical analysis software's general linear model (GLM) (SAS 2009). Means were separated using Duncan's Multiple Range tests (DMRT) at a 0.05 significance level. The results showed that soybean and chickpea-based diets were most acceptable, while ground *Prosopis juliflora* pod-based diets were the least acceptable to bees. Bee colonies fed with soybean and chickpea-based supplements had the highest sealed brood area compared to the other supplements. The unsupplemented bee colonies had the least worker-sealed brood area. The colonies supplemented with soybean and chickpea feed had a higher bee population and produced better honey compared to the control. Conclusion soybeans and chickpeas are viable supplements for the development, strength of bee colonies and honey production during the dearth period.

Keywords: Brood area, dearth period, langstroth hive, supplement diet

The effect of biochar and water management on paddy rice in the Ruzizi plain, Democratic Republic of Congo

^{1,2}Muhindo, D., ²Lelei, J. J., ¹Munyahali, W., ³Rewald, B., ¹Cizungu, L. and ²Mwonga, S.

¹Faculty of Agronomy, Université Catholique de Bukavu (UCB), P.O. Box 285 Bukavu, DRC; ²Department of Crops, Horticulture and Soils, Egerton University, Kenya, P.O. Box 536-20115 Egerton, Kenya ³University for Natural Resources and Life Sciences Vienna, Austria Corresponding Author: muhindo.iragi@ucbukavu.ac.cd, +243992207871

ABSTRACT

Rice production in the Democratic Republic of the Congo (DRC) does not meet local demand despite its enormous production potential. Optimising nutrient and water management is crucial in this region to ensure high and sustainable rice production. This study aimed at evaluating the response of rice to combined application of biochar, mineral fertiliser and watering regimes in the Ruzizi plain, Eastern DRC. Field experiments were established in Luberizi, Kiringye, and Lubarika, in the Ruzizi plain, from August 2021 to December 2021. Split split-plot in a randomized complete block design (RCBD) was The sub sub-plots consisted of fertilisation treatments: unfertilised control, 5 tonnes ha⁻¹ rice husk biochar (BC), 5 tonnes ha⁻¹ manure charged biochar (MCBC), NPK, NPK + BC, NPK + MCBC. The subplots were rice cultivars, TAI and AR2017105. The main plots were permanent flooding (PF) and alternate wetting and drying (AWD) irrigation. A three-way ANOVA was used to analyse the vegetative and yield parameters collected. The findings showed that the combination of biochar and mineral fertiliser had positive and significant (P<0.05) effects on rice, however the magnitude of the effects were location and rice variety dependent. Compared to the unfertilised control. NPK+BC respectively increased yield from 2.6 to 6.8 tonnes ha⁻¹ in Luberizi and 5.2 to 7.9 tonnes ha⁻¹ in Kiringye while NPK+MCBC increased yield from 5 to 8 tonnes ha⁻¹ in Lubarika. When applied alone, the two types of biochar resulted in significantly lower growth and yield parameters as compared to treatments that received mineral fertilisers with and without biochar. The application of water treatments had no significant (P>0.05) effect on the crop yield. However, AWD significantly (P<0.05) enhanced nitrogen uptake from 120 to 130 kg N ha⁻¹ in Kiringye and from 130 to 150 kg N ha⁻¹ compared to PF. The highest nitrogen uptake (348 kg N ha⁻¹) was obtained, in Lubarika, through the interaction between TAI cultivar and NPK+BC. Based on the findings, applying irrigation whenever the water level drops to 15 cm, as is the case with AWD,

in combination with the use of both mineral fertiliser and biochar, is recommended as a climate-smart practice for increasing nitrogen uptake and rice yield in rice farms in a sustainable way in DRC.

Keywords: Biochar, grain yield, nitrogen uptake, rice, watering regimes

Quality assessment of Lake Victoria water hyacinth (*Eichhornia crassipes*) compost systems

*Obondo, K. O., Lelei, J. J. and Mwonga, S. M.

Department of Crops, Horticulture and Soils, Faculty of Agriculture, Egerton University P.O. Box 536-20115 Egerton Njoro Kenya Corresponding Author: kevinobondo@vahoo.com

ABSTRACT

The decline in fertility of soils due to improper farm planning among other factors often contribute to losses in crop productivity in sub-Saharan Africa. Organic amendments could improve soil fertility. The objective of this study was to assess the quality of water hyacinth (Eichhornia crassipes) compost prepared by thermophilic composting as control treatment, vermicomposting and composting using effective microorganisms (EM) solution. The study was conducted between November 2019 and February 2020 in Asembo Bay of Siaya County, Lake Victoria basin. Thermophilic composting was carried out using the pit method, vermicomposting using red worms (Eisenia fetida) and EM composting using a solution containing photosynthetic bacteria, lactic acid bacteria, yeast and fermenting fungi. The three composting systems were replicated three times in a randomized complete block design (RCBD). Data on maturity period, physio-chemical and biological properties of compost were collected and analyzed using statistical analysis system (SAS) software version 9.2. EM composting technology hastened compost maturity and increased the pH (8.5), electrical conductivity (3.24) and fungal abundance (5.63 \times 10⁴ CFU/g sample) of the end product. Vermicomposting technology improved the water holding capacity (220 % by wt.), total nitrogen content (2.72 %), total phosphorus content (1.29 %), total potassium content (1.71 %) and bacterial abundance (3.84 x 10⁷ CFU/g sample) of the end product. The composting systems significantly affected water hyacinth compost maturity period and its quality parameters, with vermicomposting being more effective in improving macronutrients content of mature compost. Therefore, vermicomposting system can be recommended as the most promising technology for enhanced quality of water hyacinth compost.

Keywords: Composting systems, *Eichhornia crassipes*, Lake Victoria

Economic viability of using ovsynch and fixed timed artificial insemination protocol in breeding improvement of pastoral herds in the Rangelands

*1Agutu, O. F., 2Mbuku, S. M., 1Ondiek, O. J., 1Bebe B. O.

1Department of Animal Sciences, Egerton University,
P.O. Box 536, 20115 Egerton, Kenya; 2Kenya Agricultural and Livestock
Research Organization, Veterinary Science Research Institute, Muguga North,
P.O. Box. 32, 00902 Kikuyu, Kenya

*Corresponding Author: agutufredricks@gmail.com

ABSTRACT

Though using Assisted Reproductive Technologies (ARTs) can improve oestrus detection, conception and pregnancy success, thus benefit breeding program implementation, empirical evidence of their economic viability is lacking to inform investment decisions in pastoral herds. This study assessed economic viability of using OvSynch and fixed Timed Artificial Insemination (TAI) protocol in Sahiwal upgrading breeding program under two hypothetical cases of best and worst in activity-based money allocations when pastoral herds deploy either optimal or low input husbandry practices. From herd owners' assessment of milk production, best-case scenarios attain on average 10 litres/cow/day with optimal husbandry and 5 litres/cow/day with low input husbandry. The worst-case scenarios attain 5 litres/cow/day with optimal husbandry and 1 litre/cow/day with low input husbandry. Benefit- Cost Analysis (BCA) estimated Net Present Value (NPV), Benefit-Cost ratio (BCR) and Internal Rate of Return (IRR) to establish economic viability of using OvSynch and TAI Protocol in pastoral breeding programs. Both best-case scenarios retuned positive NPVs (82.028 and 6.912), BCR values (1.68 and 1.08) and IRR (27.46% and 8.08%) while worst-case scenarios returned negative NPVs (-135,855 and -141,025), BCR values of below 1 (0.87 and 0.66) and IRR values below the minimum rate of returns. These economic parameters were sensitive to price changes in inputs and outputs, under both optimal and low input husbandry practices. Results indicate that using OvSynch and TAI Protocol is a profitable and economically viable investment under optimal husbandry practices but not under low input husbandry practices. By implications, use of OvSynch and TAI Protocol in Sahiwal upgrading breeding programs need be accompanied with improved husbandry practices and de-risking pastoral herd owners from price changes in input and output markets.

Keywords: Assisted reproductive technologies, breeding program, economic viability, Husbandry practices, pastoral systems, Sahiwal

Transgenic expression of sugarcane mosaic virus VPg in maize inbred line CML444 confers resistance to maize lethal necrosis disease

Obara, J., Mulwa, R., Oyoo, M., Karwitha, M., Runo, S. and Garcia-Ruiz, H.

Department of Crops, Horticulture & Soils, Egerton University, P.O Box 536-20115, Egerton, Kenya Corresponding Author: justusanyieni@gmail.com

ABSTRACT

Maize is the most important crop in Kenya and parts of Sub-Saharan Africa. However, yields are below potential due to abiotic and biotic constraints. One of the major biotic concerns is maize lethal necrosis disease (MLN), which causes up to 100% yield losses. MLN is caused by the synergistic infection of two viruses, Maize chlorotic mottle virus (MCMV) and potyviruses, such as Sugarcane mosaic virus (SCMV). Because MLN is dependent on synergism, reduction of infection by either virus is expected to confer resistance or tolerance to MLN. Proteins P1, HC-Pro and VPg are essential for SCMV replication and movement. We hypothesized that transgenic expression of SCMV P1, HC-Pro or VPg confers resistance to SCMV and thus, to MLN. To test this hypothesis, we transformed maize inbred line CML444 with SCMV P1, HC-Pro or VPg genes. Presence of the transgenes in T1 plants was confirmed through PCR and T2 plants evaluated for MLN resistance using a detached leaf assay. Whole plant assays were not possible due to the legal restrictions on MLN assay in Kenya. MLN severity was evaluated on a scale of 1-5 using the chart developed by CIMMYT. Leaves from VPg transgenic plants exhibited a severity score of 1.44 an indication of no MLN. In contrast, leaves from P1 and the HC-Pro transgenic plants had excessive chlorosis with a score of 4.0 and 4.1, respectively, while the susceptible control was completely chlorotic with a severity score of 5.0. Based on the area under disease progress curve, the VPg, HC-Pro, and P1 transgenics had 6.44%, 22.43%, and 17.48%, respectively, while the susceptible control had 23.13%. Analysis of variance revealed that the area under disease progress curve and MLN severity scores were significantly (p<0.05) different across the transgenes, with VPg providing the most protection against MLN. These results show that MLN management can be improved through transgenic induced RNA silencing by transgenic expression of SCMV VPg.

Keywords: VPg, transgenic maize, host induced gene silencing, small interfering RNAs, transgenic resistance.

Uganda's production potential of Black Soldier Fly larvae for use in pig diets: A mini-review

*1Kasima, S. J., ²Muyinza, H., ³Mugonola, B. and ¹Ndyomugyenyi, K. E.

¹Department of Animal Production and Range Management, Faculty of Agriculture and Environment, Gulu University.

P. O. Box 166, Gulu, Uganda

²National Agricultural Research Laboratories, Kawanda,

P. O. Box 7065, Kampala (Uganda)

³Department of Rural Development and Agribusiness, Faculty of Agriculture and Environment, Gulu University,

P. O. Box 166, Gulu, Uganda

Corresponding Author: kasi95js@gmail.com; +256 789 702 364

ABSTRACT

Uganda's pork consumption has steadily grown over time and will follow the same trend even in the next two decades. However, the commonly used protein sources (silver fish and soybeans) for formulating pig diets in Uganda are expensive and are used as human food. The current review explores the potential of using Black Soldier Fly (BSF) larvae as an alternative protein source in pig diets. The review mainly delves into the potential of using the unexploited raw material base (organic wastes) to raise enough BSF larvae for sustaining Uganda's pig feed production. On an annual basis, the food wastes from Uganda's urban centres alone can produce enough BSF larvae for formulating pig diets that can feed the 4.4 million pigs in Uganda for over 5 months. Due to insufficient information on other wastes like animal manure and crop wastes from rural areas, it was extrapolated that the total annual organic waste production from all over the country could sustain raising BSF larvae for use in formulating pig feeds that can feed the 4.4 million pigs all year round, and even be extended to some other enterprises like poultry. This extrapolation was based on the assumption that all pigs in Uganda are intensively managed and fed on complete feeds formulated using BSF larvae as the protein source. In conclusion, Uganda can produce enough BSF larvae for feeding her pigs all year round, and can potentially sustain her future pork demand. There's need to sensitize the different stakeholders on the importance of using BSF larvae as an alternative protein source in pig diets.

Key words: Black soldier fly larvae; food waste; pig diets; pork; organic wastes

Evaluation of yield and yield components in selected wheat varieties in Kenya

Katana, J. G., Kilonzo, K. A., Wanyoike, G. W., Okumu, M. and Owuoche, O. J.

¹Egerton University, Department of Crops Horticulture and Soil Science,
P.O. Box 536-, 20115 Egerton Kenya

Corresponding Author: johngandi254@gmail.com

ABSTRACT

Wheat is one of the important cereal crop in the world and in Kenya. Despite its importance in Kenya, wheat production faces significant challenges arising from abiotic, biotic stresses which have led to instability demand and supply of wheat. The objective of this study was to determine the yield and yield components of wheat varieties REYNA 29, REYNA 8, DHAB and TEVEE 5 in a field experiment conducted at Egerton University in a randomized complete block design. Data was collected on the number of leaves, spikelets, tillers, biomass, plant height, thousand kernel weight (TKW) and yield. The collected data was subjected to analysis of variance using Stastical Analysis System version 8.2 and means were separated using least significant difference. The results showed that effects due to varieties were significant ($p \le 0.05$) for the yield and significant ($p \le 0.01$) for number of leaves and number of spikelets and highly significant ($p \le 0.001$) for number of tillers, biomass, height and TKW. The mean number of spikelets ranged from 8 to 12 while TKW of the varieties was between 27.3-37.2g. Notably, REYNA 29 produced 26.5% heavier grains compared to DHAB and had the highest tiller count of 13. Variety DHAB attained highest mean plant height of 60.30 cm while TEVEE 5 had 45.70 cm. The average grain yield ranged from 1.6 to 2.4 tonnes ha⁻¹ with REYNA 8 producing the highest grain yield. Positive correlations were observed between biomass and number of leaves (r=0.94**), number of spikelets and leaves (r=0.98**) and biomass (r=0.96*). Results revealed REYNA 8 and REYNA 29 demonstrated superior yields and kernel weight, respectively hence can be used in wheat improvement breeding programs.

Keywords: Correlation, grain yield, spikelets, TKW, wheat

Identification of antibiotic-resistant bacteria in commercial fish farms in Hungary

^{1,4*}Mohammed, E. A., ²Tóth, R. B. H., ²Kardos G., ³Károly, P. ¹University of Debrecen, Department of Animal Science; ³Dept. of Food Science, Faculty of Agriculture and Food Sciences and Environmental Management, Hungary

²University of Debrecen, Institute of Metagenomics, Hungary ⁴Agricultural Research Corporation, Integrated Pest Management Research Center, Wadmadani, P.O. Box 126, Sudan

Corresponding Author: elshafia@agr.unideb.hu

ABSTRACT

The common carp (Cyprinus carpio) is a popular species in fish farms in Hungary (Europe). Since Hungary is a member state of the European Union, the use of antibiotics for growth promotion of animals has been banned since 2011. An even stricter legislation came into force in 2022 to inhibit the spread of antibiotic resistant bacteria in animals and humans, in accordance with the Farm to Fork Strategy. Nevertheless, new strains of AMR conferring bacteria may appear in fish farm lakes as a result of antibiotic treatment of bacterial infections, or due to wild birds as reservoirs. Antibiotic resistance genes (especially in form of mobile genetic elements, e.g. plasmids) may pose a serious threat to the fish production, health of employees, and environment. The current study aimed to survey the occurrence of antibiotic resistant bacteria and confirm their identity in water samples of commercial fish farms in Hungary. Twenty water samples were collected from two fish farms and subjected to bacterial isolation using a membrane filtration technique (pore size: 0.45-micrometer). Then the membranes were placed on different types of selected media (VRE, Eosin Methylene Blue and Endo's Medium). Bacterial colonies were subjected to matrix-assisted laser desorption ionization-timeof-flight mass spectrometry (MALDI-TOF MS) technique for species level identification. The following species were detected: Acinetobacter baumannii, A. calcoacetius, A. junii, A. pittii, A. tandoii, Bacillus pumilus, Comamonas aquatica, Enterococcus casseliflavus, E. gallinarum, Escherichia coli, Lactobacillus plantarum, Ochrobactrum intermedium. Pediococcus pentosaceus, Pseudomonas aeruginosa, P. alcaligenes, P. mendocina, P. otidis, P. putida and Stenotrophomonas maltophilia. In the next step, we will use antibiotic tests to investigate, whether these isolates have some unusual extrinsic antibiotic resistance. In addition, we will perform PCR experiments to detect the presence of virulence factors and toxin producing genes.

Keywords: AMR, antibiotic resistant bacteria, Common carp, MALDI-TOF MS, PCR

Climbing Bean Performance under different Irrigation Levels and Mulching types in Eastern Rwanda

Lelei, J., Owido, F. O. S. and Uwanyirigira J.

Department of Crops Horticulture and Soils, Egerton University
P.O. Box 536-20115 Egerton Kenya

Corresponding Author: joycendemo@yahoo.com

ABSTRACT

Bean is a major subsistence crop in Rwanda. Approximately 50% of bean growers in the country cultivate the climbing bean variety. It is mainly grown under rainfed conditions in small holder farms. Water stress is a major constraint to its production in the Eastern region of Rwanda. The region is semi-arid and prone to drought. The objective of the study was to determine the effect of irrigation levels and mulching types on growth and yield of climbing beans in Bugesera district located in Eastern Rwanda. The experimental design was a split plot in a randomized complete block design, with three replicates. The main plot factors consisted of irrigation levels (rainfed, 50% irrigation and 100% irrigation). The subplot factors were mulching types (no mulch, grass mulch and plastic mulch). Plant height was measured at 30, 40 and 50 days after plant emergence. Grain weight and yield were determined at crop physiological maturity. General linear model procedures were performed using Statistical Analysis Software package (SAS), followed by Fisher's least significant difference (LSD, p = 0.05) procedure for treatment means comparison. Highest values of plant height, 100 grain weight and yield were obtained under the combination of 50% irrigation level with grass mulch. Compared to the control, yield improvement of 83%, 100 grains weight improvement of 39% and plant height increase of 20 % were observed under combination of 50% irrigation and grass mulch. This combination results to 50 % water saving and is recommended for improved climbing bean performance in Bugesera, Eastern Rwanda.

Keywords: Climbing beans, irrigation, mulch

Effect of butternut squash (*Cucurbita moschata*) seeds powder on the chemical and rheological properties of cultured camel milk and yoghurt

Kangogo K.C., Muliro, S. P. and Anyango, O. J.

Department of Dairy, Food Science and Technology, Egerton University, Nakuru, Kenya

Corresponding Author: kangogocollinskiprotich@gmail.com

ABSTRACT

Fermented camel milk products are difficult to produce because of their weak texture and thin consistency, which makes them unpopular with consumers. Unlike bovine milk, camel milk does not coagulate well because of its lack of interaction between κ-casein and β-lactoglobulin, the large casein micelle size, leading to a weak network of caseins easily broken during coagulum formation. Butternut squash (Cucurbita moschata) seeds, a by-product could be used to remedy these challenges. Therefore, this study was aimed in determining the effect of butternut squash seeds powder (BSSP) on the chemical and rheological properties of cultured camel milk and yoghurt. The fermented camel milk products were prepared using 4 litres of camel milk, 2% starter cultures (thermophilic culture for yoghurt and mesophilic aromatic culture for cultured milk) and 0.0% (control), 0.4%, 0.8%, 1.2%, 1.6% and 2.0% BSSP. Corn starch (2.0%) was used as a standard for comparison and 0.4% gelatin as the gelling agent. Results show that increasing the BSSP level significantly (p<0.05) reduced the moisture content while increasing the total solid content of fermented camel milk products. There was a progressive increase in ash content with increase in BSSP levels. There was a significant (p<0.05) reduction in the pH, with increase in BSSP levels in fermented camel milk samples. Increasing the concentration of BSSP from 0.4% to 2.0% resulted in significant (p<0.05) increase in viscosity and a reduction in syneresis of camel milk yoghurt and cultured camel milk samples. This study shows that BSSP can be used to increase the viscosity and reduce syneresis of fermented camel milk products during storage accompanied by increased acidity products.

Keywords: Corn starch, butternut squash seed powder, gelatin, camel milk yoghurt, cultured camel milk

The role of policy interventions in shaping the four dimensions of food security in select developing countries

Opondo, E. O. and Ngigi, M.

¹Department of Curriculum Instruction and Educational Management ²Department of Agricultural Economics and Agribusiness Management **Corresponding Author:** edwinonyangoadv@gmail.com

ABSTRACT

This paper systematically reviews literature on Food Security in Developing Countries, synthesizing the existing evidence and identifying the ongoing practises among those countries as they seek to address this widespread and pervasive issue. The literature reviewed is diverse and includes The Role of Agricultural Extension Officers in Production; Factors affecting Food Accessibility in low- and middle-income residential areas in urbanizing environments of Developing Countries; Urban Agriculture; Transition from Traditional Foods to modern ultra-processed foods in Food Utilization; and Economic, Environmental and Political factors affecting food stability so as to synthesize the existing evidence, and ongoing policy interventions. systematic literature review was undertaken using Google Scholar and Science Direct, resulting in a final number of eight articles meeting the selection criteria. The studies revealed the variance in the challenges bedeviling the four dimensions of food security in the developing world. The uniqueness of the studies means that drawing any generalizations is inappropriate, rather, the specific cases should be treated specifically as they help understand the ongoing situations and practises. The paper reiterates the interlinkages among the four dimensions of Food security and reiterates that all the dimensions must be given equal attention. In conclusion, the paper highlights an aspect that is overlooked in current food security discourse, that is growth of the population. Population growth complicates the proposed solutions to the quandaries of food in/security. As population growth will certainly muddy the food security landscape, it is an evolution that must be addressed by ensuring sustainable and resilient food systems.

Keywords: Accessibility; Availability; Utilization; Stability; Population Growth

Fall Armyworm (Spodoptera frugiperda) infestation and grain yield loss on advanced sorghum genotypes under field conditions in arid and semi-arid areas in Kenya

¹Njogu, N. W., ¹Kamau, A., ¹Kimurto, P. K., ²Manyasa, E., ¹Nyaanga, J. G., ¹Charimbu, M.K. and ¹Towett, B.K.

Department of Crops, Horticulture and Soils, Egerton University, P. O. Box 536-20115, Egerton

²International Maize and Wheat Improvement Center (CIMMYT), Nairobi. **Corresponding Author:** kimurtopk@egerton.ac.ke

ABSTRACT

Fall armyworm (FAW) (Spodoptera frugiperda)) continues to cause enormous losses in Sorghum and other cereals in the world. Excessive use of synthetic insecticides to manage the pest poses environmental hazards. The objective of this study was to screen several genotypes that are resistant to FAW infestation and evaluate the grain yield loss associated with FAW infestation in sorghum. A total of 49 sorghum breeding lines from Genetic Resources Research Institute (GeRRI), and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) were screened for FAW resistance The study was carried out in Kiboko Research Center and at Koibatek Agricultural Training Centre (ATC) during the 2018/2019 long/short rain seasons. To evaluate grain yield losses caused by FAW, a protected and a non-protected trial was set up in both sites through spraying and non-spraying with insecticideThe experiments were laid out in Alpha lattice design, 49 x 7, and replicated three times. Sorghum was planted, at a spacing of 75 cm x 20 cm with 3 rows in 2.5 m by 1.5 m plots. Data was collected on host plant damage rating (DR), larval counts (LC), grain yield (tons ha⁻¹), percent grain yield loss (%), days to flowering and days to maturity. Data was analyzed using Genstat version 16 and significantly different means separated using LSD (P≤0.05). Results indicated that overall host plant damage rating was 4.44 while mean larval count was 5.53 larvae plant⁻¹ across Koibatek and Kiboko sites. Overall grain yield loss was 39.18±1.78% and grain yield was 1.55±0.07 tons ha across Kiboko and Koibatek sites. A number of genotypes including IS 21055, IS 2108, GBK-044672, IESV92041 and GBK-000392 had low larval count and damage rating as well as high yields in both Kiboko and Koibatek. Significant and positive correlation (r=0.08*) was observed between grain yield loss and host plant damage ratings. Earwigs (Forficula auricularia), lady bird beetles (Coccinella septempunctata) and big-headed ants (Pheidole megacephala) were some of natural enemies observed in this trial. Results of this study

shows there are promising sorghum genotypes that are tolerant to fall Army worm which can be used in sorghum breeding programs.

Keywords: Fall armyworm, host plant resistance, host plant damage, sorghum bicolor, screening for resistance, biocontrol

Identification of grey leaf spot resistance in F₂ maize (*Zea mays* L.) populations using simple sequence repeat markers (SSR)

*1Lagat, N., 2Oyoo, M. E., 2Murerwa P. and 2Owuoche J.

¹University of Eldoret, Biotechnology Department Box 1125 Eldoret, Kenya; ²Egerton University, Department of Crops, Horticulture and Soil Science, P.O Box 536- 20115 Egerton, Kenya

Corresponding Author: nicholaslagat3@gmail.com

ABSTRACT

Maize (Zea mays L.) is an important cereal crop worldwide especially in Sub-Saharan Africa. The yields of maize are, however, relatively low in Kenya largely due to foliar disease that significantly led to inconsistencies in productivity of maize genotypes in various environments. Identification and utilization of disease resistance mechanism and development of resistant cultivars is crucial in disease management. The objective of the study was to identify SSR markers linked to GLS resistance genes among the selected F₂ population. A total of 23 genotypes were selected based on their disease severity in the field. Initially these genotypes were selected from a group of 20 F₂, 9 parents and two checks resistant (R) and susceptible (S) to GLS. Symptomatic fresh leaves were used in the extraction of genomic deoxyribonucleic acid (DNA) and amplification done using markers linked to grey leaf spot disease. A total of four SSR markers were screened for polymorphism among the resistant F2 population. Among, the four SSR markers (Cpr1-117757, Bnlg 1258, Bnlg 1194, and Phi 031) only one primer (Cpr1-117757) was found to be polymorphic and they were used for finding out resistant gene harboring plants. The banding pattern of all screened genotypes were scored as either present (+) or absent (-) of the targeted resistant gene. Thirteen F2 population (CKDHL 120312/CKL 05017, CKL 15537/CML 568, CKDHL 120312/S₅96-15-1-1, KTLN 10123/S₅96-15-1-1, CKL 05022/S₅96-15-1-1, CKDHL 153502/S₅96-15-1-1, CKDHL 120312/CML 395, CKL 05022/ CML 395, CKDHL 153502/CML 395, CKL 15537/CML 395, CKL 05022/CKL 05017, CKL 15537/CKL 05017 and CKDHL 153502/CML 568), eight parents (CKDHL 12312, KTLN 10123, CKL 05022, CKDHL 153502, CKL 05017, CML 568, S₅96-15-1-1 and CML 395) and two commercial checks (H512 and H614) which were categorized as the resistance and moderately resistance genotypes under artificial inoculation revealed different banding patterns. The information provided by the identified marker would be very useful in breeding programs to select maize genotypes harboring GLS resistance genes.

Keywords: Germplasm, GLS, Polymorphism, Segregating and SSR

Seed priming to enhance drought tolerance of pigeon pea (Cajunus cajan L.) under dryland conditions of Kenya

Gikonyo, C., Oyoo, E. M and Kimurto, P.Department of Crops, Horticulture and Soil
Corresponding Author:

ABSTRACT

Drought is a major abiotic stress that affects plant growth and productivity. Poor seed emergence due to water stress is a key impediment to obtaining high pigeon pea yield. Seed priming has been used to accelerate synchronized seed germination, improve seedling establishment, and stimulate vegetative growth and crop yield in many plants. Field experiments were conducted at Kerio Valley and Agricultural Training Centre, Koibatek to determine the effect of different seed priming methods on yield and yield parameters of pigeon peas under drought conditions. The seeds of three pigeon pea genotypes, EUMDP 3, Egerton Mbaazi M1 and Kat 60/8 were primed with distilled water, 30% Polyethene Glycol (PEG), 1% potassium nitrate (KNO₃₎ and Gibberellic acid (GA₃) at 300ppm. Unprimed seeds as the control were also incorporated. Randomized Complete Block Design (RCBD) split-plot arrangement, with three replicates for two seasons were done. Data on seed emergence, seedling growth, days to 50% flowering, number of branches, days to harvesting and grain yields were recorded and subjected to analysis of variance at $p \le 0.05$ level of significance using general linear model (GLM) procedure of Statistical Analysis System (SAS) and means separated by Tukeys' Honestly Significant Difference Test at 5%. Results showed that seeds treated with KNO₃ had higher significantly (P≤ 0.05) different effects on 50% germination, days to harvesting, seed yield, days to 50% flowering and plant height that any other seed priming agents. Distilled water and PEG showed less effect on yield and yield parameters. Seed priming treatment could serve to increase seed germination, early seedling establishment and yield of pigeon pea under drought stress conditions and 1% KNO3 as a priming agent should be recommended for farmers in arid and semi-arid areas to ensure maximum productivity of pigeon peas.

Keywords: Seed priming, seed emergence and yield parameters

Morphological diversity assessment of Kenyan vanilla (*Vanilla spp.*) accessions

Nasimiyu, L., Oyoo, E. M. and Wolukau, J.

Depar;tment of Crops, Horticulture and Soil Science]

P. O. Box 536-20115, Egerton

Corresponding Author: Maurice.oyoo@egerton.ac.ke

ABSTRACT

Several countries have successfully bred vanilla crops based on variations in morphological traits. However, such programs are limited in Kenya as there are no published reports on the vanilla phenotypic diversity studies. The objective of this study was to characterize vanilla accessions from Bungoma, Busia, Kwale, Mombasa and Kilifi counties in Kenya using morphological traits. Morphological characteristics analyses were based on eighteen qualitative and nine quantitative characteristics. Qualitative and quantitative data were recorded and analyzed using STATA software (Ver 7, 5th edition). Factorial analysis for qualitative traits clustered the accessions into two, (I: inland western counties and II: coastal counties). Five factor analyses for quantitative traits was strongly negative for overall stem height (-0.1441) and aerial root length (-0.1329), and strongly positive for number of flowers, leaf petiole length, stem internode length, leaf blade width and leaf blade length accounting for 80.12%. The highest uniqueness was recorded for aerial root length (0.825) and overall stem length (0.734) indicating that these traits were more variable. The least uniqueness was recorded for leaf blade width (0.1099), leaf petiole length (0.1754) and stem internode length (0.180), implying that these traits were more uniform in among the accessions. Morphological variations exist in Kenyan vanilla accessions which could be used for vanilla improvement in Kenya.

Keywords: Vanilla, accessions, traits, Kenya, cluster

Striga (Striga hermonthica (Del.) Benth) tolerance of Maseno EH11 and EH14 hybrid maize varieties

¹Illa, A., ¹Cheruiyot, E. K. and ²Matasyoh, J. C.

¹Department of Crops, Horticulture and Soil, Egerton University, P.O. Box 536, Egerton, Kenya; ²Department of Chemistry, Egerton University, P.O. Box 536, Egerton, Kenya

Corresponding Author: obuyailla@gmail.com

ABSTRACT

Striga (Striga hermonthica (Del.) Benth) is an obligate root hemi-parasitic weed parasitizing maize (Zea mays L.) and other grasses causing significant losses. Two newly released hybrid maize varieties Maseno EH11 and EH14 have been bred for tolerance to Striga but their extent and mechanism of tolerance have not been elucidated. Field experiments were carried out in Western Kenya at Kibos, Nyahera and Maseno for two seasons under natural Striga infestation to determine their level of tolerance to Striga alongside a Striga susceptible PHB3253 variety and two local checks, H513 and H516. The new maize varieties were later grown in rhizotrons where the roots were infected with pre-germinated Striga seeds and histological studies carried out to determine the extent of Striga attachment at 9 days after infection. The field data included days to Striga emergence, Striga incidence and crop growth and yield. The number, length and biomass of attached Striga in the rhizotrons were determined. Data was subjected to ANOVA through the general linear model of SAS and means separated using LSD_{0.05}. Maseno EH14 took the longest time for Striga to emerge in the field, exhibited few Striga attachments across the seasons and had the highest 100-grain weight. Maseno EH14 also exhibited few and shorter Striga attachments in the rhizotrons. Histological analysis showed that most Striga haustoria were unable to penetrate the endodermis of Maseno EH14 while PHB3253 and Maseno EH11 had successful parasite-host xvlem to xvlem vascular connections although EH11 had few cases of tolerance response similar to EH14. From these findings, Maseno EH14 has Striga tolerance which could be attributed to mechanical processes occurring at the cellwall thus becoming a good source of genetic material for the development of sustainable management of Striga and could provide genes leading to development of maize varieties with host based resistance.

Keywords: Infestation, maize, striga, tolerance

Perception of smallholder chicken farmers on black soldier fly larvae (BSFL) as a super alternative protein source for chicken in Uasin Gishu County, Kenya

Koech, G. J., Gathungu, E. and Owuor, G.

Department of Agricultural Economics and Agribusiness Management, Egerton University, Njoro, Kenya

Corresponding Author: koechgladys29@gmail.com,

ABSTRACT

This study evaluates the perception of smallholder chicken farmers in the utilization of black soldier fly larvae (BSFL) as an alternative protein source, and its incorporation in livestock feed systems in Kenya, with a specific case of chicken farmers in Uasin Gishu, Kenya. The study employed a survey research design covering 245 smallholder chicken farmers interviewed through a semistructured questionnaire. Results revealed that 72.5% of the chicken farmers were aware of the benefits of incorporating BSFL in chicken feed. Principal component analysis based on perception indices revealed that social acceptability, feed performance compared to conventional protein sources, and marketability of chicken products reared on BSFL were the key attributes guiding chicken farmers' buying decisions. Awareness of BSFL attributes, education level, access to agricultural extension services, group membership, and participation in off-farm activities significantly influenced chicken farmers' perceptions of BSFL. In conclusion, the study demonstrates that interventions such as training and farm demonstrations would increase chicken farmers' technical know-how on improving the productivity of chicken reared on BSFL. Accessing agricultural extension services is essential in reducing chicken farmers' uncertainties of accepting BSFL and encouraging the uptake of this rapidly growing and emerging technology. This work adds to the current understanding of BSFL-based feeds and creates opportunities for further linkages between chicken farmers, public-private partnerships, policymakers, feed manufacturers, and consumers of chicken products.

Keywords: Black soldier fly larvae-based feed, farmers' perception, linear regression, principal component analysis, smallholder chicken farmers

Knowledge roles in Agricultural Information Networks: Evidence from dairy information networks in Nakuru County, Kenya

Nyanjong', O., Ayuya, O. I. and Kalio. A M.

Department of Agricultural Economics and Agribusiness Management, Egerton University, P.O Box 536-20115, Egerton, Kenya.

Corresponding Author: jnyanjong@egerton.ac.ke

ABSTRACT

Social networks are increasingly becoming important in the determination of critical social and economic outcomes. The objective of this paper is to interrogate the knowledge diffusion roles in agricultural information networks; specifically, dairy information networks in Nakuru County, Kenya. Three knowledge diffusion roles are contemplated for this study: knowledge sharer, knowledge seeker, and knowledge broker. Multi-stage sampling is used to select 390 dairy farmers operating in formal and informal dairy information networks. Data is collected, managed, and administered exclusively using mobile gadgets (smartphones, laptops, tablets, etc.) via the KoboToolbox software. Multinomial logit regression is used to evaluate the determinants of knowledge roles for smallholder dairy farmers. Farmers' gender, access to extension services, and group leadership increase the likelihood of a dairy farmer being a knowledge sharer of dairy information. Men dairy farmers are likely to be knowledge seekers; women dairy farmers are likely to be knowledge sharers. Further, men dairy farmers are likely knowledge brokers compared to women dairy farmers. Group leaders are likely to be knowledge sharers, whereas better educated dairy farmers are likely to be knowledge seekers. There is need for dairy extension trainings to be geared towards attendance by men dairy farmers and better educated dairy farmers. The significant gender differentials existing in income earning potential within dairy information networks, with men dairy farmers being the likely beneficiaries. Points to a need for policies targeted at incentivizing women dairy farmers towards improving their brokerage potential of dairy knowledge within existing dairy information networks. Sufficient incentives should be provided to dairy group leaders so as to encourage to share dairy knowledge with farmers. This study is expected to be of benefit to both government and non-government agencies in the formulation of optimal, goodness-of-fit extension policies targeted at specific knowledge diffusion roles for dairy farmers in agricultural information networks.

Keywords: Dairy information networks, knowledge broker, knowledge seeker, knowledge sharer, multinomial logistic regression

SUB-THEME 2

Education for National Development in a Global Context

Challenges of academic communication in a multilingual higher education setting

Getuno, D. M. and Mukuni, J. S.

Virginia Polytechnic Institute and State University
Egerton University, School of Open and Distance Education/The E-Campus
Corresponding Author: makinigetuno@gmail.com

ABSTRACT

Communication in most African universities often occurs in multilingual settings where students learn a second language and at the same time use it as a medium of instruction. In such settings, where English is the official language of communication, challenges manifest themselves through mother tongue interference, poor speaking and writing skills in English. These challenges affect both learners and instructors. Whereas some research has been conducted to study the communication implications of the learning and use of English from early grades up to high school in Kenya, there seems to be a gap in the literature regarding communication challenges at university level. This study investigated aspects of academic communication at university level among students. It is based on a mixed-methods research design. Data was collected using an interview schedule and an electronic survey. A pilot study was conducted to ascertain the validity and reliability of the research instruments. The sample comprised 321 undergraduate students and 51 lecturers from 10 faculties in a university. From the responses of both the lecturers and students, it was concluded that students' areas of weakness in communication were classified into cultural issues, linguistic challenges, technological challenges, and general communication barriers. Based on the findings of the study, the recommendations include a) Holding regular forums where administrators and students can meet at least once a semester to exchange information affecting the welfare of students and the goals and mission of the university b) Establishing a writing center within the university to support students with organizing academic papers, language, academic conventions, and readable writing; and c) Introducing a Communication Skills course focusing on skills for academic purposes and for occupational purposes

Keywords: Academic communication, multi-lingual, higher education, second language, university

Harnessing adaptive value-based education within the era of the Fourth Industrial Revolution (4IR) in Kenya

Githinji K. P.

University of Nairobi

Corresponding Author: kagemapeterson@gmail.com
0728-695-333

ABSTRACT

The world today has entered in an era of the Fourth Industrial Revolution (4IR) characterized by artificial intelligence-AI, virtual interaction, digital channels, among others. This new culture is expected to alter the way we live, perceive and interact with others hence challenge, change and disrupt every sector of our lives. Consequently, the resulting new social-cultural, moral and spiritual values have introduced to the digital generation new choices and worldviews, philosophies and cultural orientations. As such, this has created a contemporary need for the educationists and other education stakeholders to guide the latter generation through development of a value-based education. Hence, the need to harness adaptive value-based education model within the era of the fourth industrial revolution in Kenya is a request to the education industry to rethink of educational paradigms that promote long term character development in the advent of postmodern fourth industrial revolution era. This review paper aims to develop and recommend a value-based education model in the era of the fourth industrial revolution in 21st century societies, alongside assessing some of the challenges and opportunities in the education industry in the era of fourth industrial revolution. Guided by the Howard Gardner's Multiple Intelligences theory and John Dewey's social constructivism theory, the paper uses thematic content analysis of various literature on fourth industrial revolution, and holistic value-based research work to evaluate the nature of value-based education in the Kenyan context. It was found that although Kenya is on the right trajectory in the global context to implement the objectives of fourth industrial era, however, there is need to emphasize training and acquisition of social and moral values in the Kenyan learners that will complement the digital and technological skills in the global context. Ultimately, it is anticipated that such value-based education model will make the 21st century consumer of the 4IR more relevant, competent and adaptive to the challenges revolving around the new global cultural contexts. The paper hence, challenges the planers, theorists and other stakeholders in the education 4.0 era within the Kenyan context, to design and actualize value-based curriculum models that meets the holistic aspects of a 21st century Kenyan human capital.

Keywords: Adaptivity, fourth industrial revolution, opportunities and challenges, value-based education

Efficacy of agriculture teaching practice projects in secondary schools: The case of Egerton University tracer study

Kyule, M., Mutonga, S. and Mungai, N. W.

Department of Agricultural Education and Extension and ³Department of Crops, Horticulture and Soils, Egerton University P.O Box 536-20115, Egerton, Kenya **Corresponding Author**: miriam.kyule@egerton.ac.ke

ABSTRACT

Project Based Learning (PBL) is a participatory approach that equips trainees with transferable competencies for utility. However, the potential of PBL training approach has not been scientifically documented. The efficacy of Agriculture Teaching Practice Projects (ATPPs) in secondary schools was evaluated through a tracer study of Agricultural Education and Extension Degree and Diploma graduates for the last 10 years (2011-2000). Three objectives guided this study. A questionnaire was developed and uploaded on Google forms and thereafter pilot tested for reliability using 36 graduates of 2005 to 2009 cohorts and its Cronbach's Alpha, reliability coefficient was 0.79. Out of the targeted 1,500 respondents, those accessed were 1,408 and 541 of them responded. The response rate was 37.2%. Data collection was done online. Statistical Package for the Social Sciences (SPSS) Version 25 was used to analyze and generate results. From the findings, majority of the respondents established rabbit projects (14.4%), vegetable projects (11.8%) and chicken rearing (10.2%). On transferability of Project Based Training (PBT), 97.4% indicated that they were still using the skills acquired. However, only 70% of respondents indicated that they had established projects in their current stations. Over 91% had established at least a project of whom, 32% had established three or more projects. Among the non-teachers, transferability was 100% as they indicated that they were applying the knowledge and skills learnt from ATPPs. Its worthy noting that only 13.4% of the established ATPPs could be used as a resource to teach across Forms 1-4 while 56.4% of the established ATPPs could only be used in teaching one class only. The study recommends that Egerton University through Department of AGED to deliberately phase out the projects that are short-lived for the benefit of host schools, and review their curriculum to infuse the concept of transferability of PBT.

Keywords: Agriculture teaching practice projects, graduates, Project Based Learning, secondary schools

The relevance of capital market literacy to the academic staff of Federal College of Education Katsina, Katsina State, Nigeria

¹Musa, S. R. D., ²Muhammad, M. T. and ³Ibrahim, K. U.

¹Department of Social Science and Humanity Federal College of Education Katsina, Katsina State Nigeria; ²Department of Business Education.

Federal College of Education Katsina, Katsina State, Nigeria; ³Department of Social Science and Humanity Federal College of Education Katsina.

Katsina State, Nigeria

usman.kibrahim@fcekatsina.edu.ng; musatsagem@gmail.com +234 8028844447

Corresponding Author: shuaibu.rafindadi@fcekatsina.edu.ng

ABSTRACT

The paper examines the financial benefits and challenges associated with the involvement of academic staff in capital market activities, emphasizing the role of financial literacy, investment opportunities and wealth creation. The paper also provides insight into how academic staff can explore the capital market landscape and financial contributions to their socio economic well-being. The paper was quantitatively designed in order to have wider respondents. The instrument for data collection was closed ended questionnaire. Random sample technique was employed aided by COASU WhatsApp platform. 200 Academic Staff (representing 54% out of 365 Academic Staff) was involved for convenience. The data was collected through the use of google form and transfer to excel for analysis. The findings revealed that, most of the Academic Staff are participating in the Nigerian Stack Exchange Market (NSE) but not in other instruments and some are ignorant about the activities of Capital Market and some are not participating due to fear of scammers. Lastly, it was recommended that Academic staff should participate in Capital Market activities for sustainable economic empowerment and wealth creation.

Keywords: Academic staff, capital market, literacy

The role of higher education in Kenya in promoting national development in a global context: A Case of Egerton, Kenyatta, Nairobi and Strathmore Universities

Gichuru, N. E.

College of Education and External Studies, Makerere University, Uganda ORCiD: https://orcid.org/0000-0002-5363-5443
Corresponding Author: ngothogichuru@gmail.com

ABSTRACT

This study delves into the intricate relationship between higher education and national development in Kenya, focusing on four prominent institutions: Egerton University, Kenyatta University, the University of Nairobi, and Strathmore University. The research adopts a mixed-method approach, combining qualitative and quantitative methods to comprehensively examine graduate employability, research output, and economic contributions. Egerton University and Kenyatta University emerge as key players in preparing graduates for innovation and global collaboration. Egerton's focus on STEM fields and initiatives such as the Agro-Science Park empower graduates to become job creators, fostering an entrepreneurial culture. Kenyatta University, with its emphasis on STEM fields, entrepreneurship, and critical thinking. strives to enhance its impact on Kenya's global progress. Both Kenyatta University and the University of Nairobi prioritize research and dialogue for open citizenship and cultural enhancement. Kenyatta University concentrates on critical areas such as food security, water management, and public health, while the University of Nairobi offers focusing on critical thinking, problem-solving, programs entrepreneurship. These institutions aim to equip graduates with the skills necessary for a globalized world and contribute to a more equitable and sustainable future. Challenges faced by these universities include the delicate balance between academic integrity and commercial interests, maintaining high academic standards, and expanding access to higher education. The study suggests that online learning platforms and digital research tools can enhance access and efficiency for Kenyan students. Collaborations with the government and private sectors are also recommended to improve resource mobilization and address national development priorities. Strathmore University, while emphasizing entrepreneurship, innovation, and open dialogue, faces the challenge of balancing academic rigor with industry needs. Strengthening ties with Kenyan businesses and international corporations is proposed as a solution to bridge the gap between academia and industry, contributing to Kenya's holistic development. Overall, this research sheds light on the intricate dynamics between higher education and national progress in Kenya, offering insights and recommendations for the future.

Keywords: Egerton, global context, higher education, Kenyatta, Nairobi, Strathmore

Perceived impact of entreprenuership education as a tool for job creation, poverty reduction and national development in Nigeria

¹Bala, U. and ²Umar, S.

¹Department of Business Education, Federal College of Education, Katsina, Nigeria ²Department of Business Education, Federal College of Education, Katsina Nigeria, abuhuzaifa679@gmail.com

Corresponding Author: umarbalakkr@gmail.com, +2348068177094

ABSTRACT

This paper examines the perceived impact of entrepreneurship education as a tool for job creation, poverty reduction, and national development in Nigeria. The study adopted a descriptive survey design. The population of the study consisted of 420 entrepreneurs who graduated from six business apprenticeship training centers (BATCs) in Katsina state and graduated students of the Business Education Department, Federal College of Education, Katsina 2021/2022 session. A stratified sampling technique was used in the selection of the sample. The sample size of 201 graduates was used, determined by Krejcie and Morgan (1970). The research instrument was a structured questionnaire developed for the study. The instrument was validated by experts and its reliability was determined using Cronbach alpha Reliability Coefficient ($\alpha = 0.81$). Two hypotheses guided this study. Data gathered from the questionnaire were analyzed using regression analysis; in particular H₁ and H₂ is Strong with regression weight 0.739[p<0.001] and 0.730 [p<0.001] respectively on job creation and poverty reduction. The results of the study revealed that entrepreneurship education had a significant impact on job creation, poverty reduction, and national development in Nigeria and graduates from BATCs acquired more entrepreneurial skills than graduates of Federal College of Education, Katsina due to more engagement in practical training. The study thus concluded that entrepreneurship education plays a crucial role in job creation, poverty reduction, and national development. The study recommends that the government should introduce entrepreneurship training centers in the Colleges of Education in Nigeria for practical skill acquisition among the students, provide adequate funds and equipment for the operation of the training centers, and ensure that both students of BATCs and Colleges of Education has access to loans, financial assistance or equipment for enterprises development after graduating.

Keywords: Entrepreneurship education, job creation, national development' poverty reduction

Correlation between entrepreneurship education and students' entrepreneurial intentions: A case of the University of Dar es Salaam, Tanzania

Gichuru N. E. and Kahangwa, L. G.

School of Education, University of Dar es Salaam, Tanzania

Corresponding Author: ngothogichuru@gmail.com

ABSTRACT

Tanzania's government has instituted measures to foster entrepreneurship training and business initiatives, such as the National Entrepreneurship Training Framework. Despite attempts to instill entrepreneurial skills at the university level, there has been a decline in self-employment among graduates. This research aimed to explore the connection between university-level entrepreneurship education and entrepreneurial intentions of student-teachers at the University of Dar es Salaam. Utilizing correlation research methodology, the study took place at the University of Dar es Salaam, which comprises various colleges, schools, institutes, and centers. The chosen UDSM includes two constituent colleges, seven on-campus colleges, seven schools, seven institutes, and thirteen centers. Entrepreneurship education primarily occurs at UDSM through UDBS, with coordination in SOED for Bachelor of Education in Commerce student-teachers. Simple random sampling, involving 36 respondents from each target population, was employed for probability sampling. The findings revealed no statistically significant association between university entrepreneurship education and entrepreneurial intentions among student-teachers at the University of Dar es Salaam. The null hypothesis was accepted due to the absence of a statistically significant correlation between studying university entrepreneurship education and possessing high entrepreneurial intentions among student-teachers at the School of Education, University of Dar es Salaam Mwalimu Julius Nyerere Mlimani campus. These results warrant further exploration of the study's focus to attain a definitive and undeniable perspective. Future research should delve into the reasons behind the statistically significant correlation between university entrepreneurship education and entrepreneurial intentions among student-teachers at SOED in UDSM, examining both undergraduate and post-graduate levels at SOED.

Keywords: Entrepreneurship education, entrepreneurial intentions, general enterprising tendency, higher education; Tanzania

Project Based Training as a strategy for equipping Z-Generation work force with transferable agricultural competencies

¹Kyule, M., ¹Mutonga, S. and ²Mungai, N. W.

¹Department of Agricultural Education and Extension

²Department of Crops, Horticulture and Soils, Egerton University

P.O Box 536-20115, Egerton, Kenya

Corresponding Author: miriam.kyule@egerton.ac.ke

ABSTRACT

The Z-generation is being trained at a time when the world is undergoing global challenges in agriculture. These challenges call for global concerted solutions where education takes the center stage. Thus, pedagogical approaches to equip trainees with problem-solving competencies cannot be undoubtedly estimated within the educational sphere. Project Based Learning (PBL) has been found to equip trainees with 21st century skills for problem solving. The paper documents the findings from a tracer study conducted in 87 secondary schools across three Teaching Practice zones, spanning a period of 10 years. Evidently, the findings reveal onsite success cases of PBL by Agricultural Education and Extension (AGED) undergraduate students where a total number of 125 Agriculture Teaching Practice Projects (ATPPs) were traced with 36 percent of them being still in existence. Of these, livestock production emerged as the most common type of project with 34.5% while farm structures accounted for 19.6% of all the projects that were still in existence. Over time, most of the livestock production structures done as ATPPs had either been transformed into other structures or demolished due to competition for space. Transferability was measured on three fronts namely the application of Project Based Training (PBT) after graduation, use of the ATTPs in teaching other subjects and application of the PBT in establishing teaching learning projects by the AGED graduates in their stations. From the findings, it was concluded that less than half of the ATTPs established were still in existence and in use by over 87% of the teachers. Transferability of PBT existed either in teaching other subjects, establishing new agriculture teaching projects in schools or teaching agriculture subject. The study recommends that training institutions need to deliberately repump the PBT for acquisition of transferable skills necessary in solving global challenges.

Keywords: Agricultural Teaching Practice Projects, global challenges, Project Based Training, Problem solving, Zoomers generation

General enterprising tendencies of student teacher at school of education, University of Dar es Salaam, Tanzania

Gichuru, N. E.

College of Education and External Studies, Makerere University, Uganda ORCiD: https://orcid.org/0000-0002-5363-5443
Corresponding Author: ngothogichuru@gmail.com

ABSTRACT

The purpose of the study was to determine if there is statistically significant mean difference in the following entrepreneurial tendencies (need for achievement, need for autonomy, creative tendency, calculated risk taking and internal locus of control) between recipients of university entrepreneurship education (Bachelor Of Education in Commerce) student-teachers and those who do not (Bachelor of Education in Adult and Community Education) at School of Education of University of Dar es Salaam, who were the target population of this study. Total sample size was 36 participants. Independent sample t-test two tailed was used to compare the mean difference. The small sample size means that the findings of this study can only be generalized at among student-teachers at Bachelor degree level at School of Education, University of Dar es Salaam Mwalimu Julius Nyerere Mlimani Campus. Apart from need for autonomy, there was no statistically significant mean difference between the target population of this study. The study recommended further studies to ascertain why there is statistically significant mean difference in terms of need for autonomy between recipients and non-recipients of University Entrepreneurship Education at the location of study.

Keywords: Calculated risk taking, creative tendency, internal locus of control need for achievement, need for autonomy

Effects of simulation teaching technique on co-educational secondary schools students' attitude towards learning physics in Buuri-East Sub-County, Kenya

Ndegwa. A. G., Ngeno J. K. and Ndeke. G. C. W.

Department of Curriculum, Instruction and Educational Management Egerton University, Kenya

Corresponding Author: agata0215.af@gmail.com,

ABSTRACT

Learner's performance on secondary school physics in the Kenya National Examination Council is below average. This poor performance may be attributed to conventional teaching techniques that are applied in teaching physics that leads to students having a negative attitude towards the subject .Hence this study sought to investigate the effect of Simulation teaching technique on students' attitude towards learning physics specifically on the topic Magnetism. The teaching technique uses computer simulations to concretize learning in the classroom and in the process improves attitude towards the subject Solomon-four, non-equivalent research design was used. Four schools were purposefully sampled from the 16 co-education day secondary schools in Buuri East Sub-County of Meru County, Kenya. The sampled schools were randomly assigned to experimental and control groups. A total of 123 students from the sampled schools were involved in the study. Students Attitude Questionnaire (SAQ) was used to collect data on students' attitude towards learning physics. The instrument was validated and pilot tested for use in data collection. Cronbach alpha was used to estimate the reliability of SAQ, and a reliability coefficient was found to be 0.73. Both descriptive and inferential statistics were employed in data analysis, these included mean-score, t-test and ANOVA. All statistical tests were tested at a 0.05 alpha level of significance. The results revealed that the students who were exposed to the treatment improved their attitude towards learning physics. However, the difference was not statistically significant. The results also showed a difference between boys and girls attitude towards learning physics though it was not statistically significant. The study recommends that physics teachers should embrace the use of simulation in teaching to boost students' performance and attitude towards learning physics.

Keywords: Magnetism, performance, physics, simulation teaching techniques, students' attitude

Influence of higher education students loans scheme on career choices among university students in Tanzania

Sululu J., George V. and Kahimba J.

Institute of Development Studies, The University of Dodoma, Tanzania **Corresponding Author:** sululujacob1164@gmail.com, +255-764070790

ABSTRACT

Career choice has currently become a very complicated decision among university students, since the decision is influenced by numerous factors. However, choosing the right career is important for ensuring that individuals become more capable and motivated in work places. This paper aimed at assessing the influence of Higher Education Students Loans Scheme on Career decision among University students in Tanzania. To address this objective, the cross-sectional survey of 480 loans beneficiaries was adopted for collecting data from four sampled universities. Yamane (1967) formula was applied to obtain the sample size. Data were collected using survey and key informant interview and analysed using descriptive and inferential statistics such as frequency, percentage and correlation coefficient. The findings revealed that, though individual aspiration has dominated the decision of many students on what to learn, such aspiration has been realised to be born based on degree programs which are of higher loans priority by the government. Thus, the decision to right career of many students was lessened. This study recommends on the review of the Higher Education Loans Scheme to provide a wider space on students' choices of degree programs of their preference for producing skilled human resources towards national development.

Keywords: Career choice, cost sharing, higher education loan, university students

Reviewing the impact of staffing and resources supply in preparedness of teaching competence-based curriculum (CBC) public junior secondary schools in Nakuru County, Kenya

Maina M. E.

Egerton University

Corresponding Author: essiemuth8@gmail.com
0729365111

ABSTRACT

Education is an essential tool for social and economic growth in a society. Countries that have superior investment in education system often benefit from remarkable economic and technological growth. In this case, governments across the world regularly review and improve the education curriculum to constantly keep abreast with the demands of society. An excellent education curriculum will facilitate the implementation of better education practices and make the learners more productive in the workplace. Kenya is in the process of implementing the competence-based curriculum and poor staffing and inadequate resources supply has been identified as limiting aspects towards the implementation and expected outcomes of the new curriculum. The current descriptive analysis is qualitative research and used secondary sources from reputable education websites and databases. Mainly the databases accessed include Google scholar and the East African journals of education. The inclusion criteria included peer reviewed articles reviewed not later than 2021. The articles had to discuss education in terms of staffing and resource distribution in Africa and Kenya in particular. The researcher factored in a few papers on education in America and Europe to have a balanced literature review. Article journals that were omitted included those touching on other topics of education, those older than 2021, websites and Wikipedia. The study discovered that shortage of manpower and resources is a major hampering in advancement and implementation of the new curriculum. By 2023 Nakuru had a total of 1212 schools-877 primary schools and 335 secondary schools. The junior secondary schools are based in the primary section and by 2023 Nakuru has a shortage of over 3000 junior secondary teachers. The resources are not well distributed especially in rural areas making it challenging to meet the requirements of CBC. There is need to increase funding for technology, training and innovation among the teachers and schools to increase better CBC outcomes in Nakuru County.

Keywords: CBC, implementation, Kenya education, staffing, resources supply

Effects of teachers' gender on students' academic achievement in physics in some selected senior secondary schools of Katsina Metropolis, Katsina State, Nigeria

Umar, Y. A.

Federal College of Education Katsina, Katsina State Corresponding Author: aminuyakubu3648@gmail.com

ABSTRACT

This study was carried out to examine the effect of teachers' gender on students' achievement in physics in Katsina metropolis, Katsina State, Nigeria. To achieve this objective, two research questions and two research hypotheses were formulated to guide this study which was tested. EX-Post facto research design was adopted for the study. The data collected were analyzed. Mean and standard deviation were used to analyze the research questions while independent T-test statistical method and Chisquare test were used for testing of research hypotheses. A structured questionnaire and physics achievement test (PAT) were used as the main instrument for data collection from the respondents in all the selected secondary schools in Katsina Metropolis. After careful analysis of the data, the following findings were revealed: there is a difference in physics academic achievement between students taught by male teachers and students taught by female teachers, and the factors that contributes to this difference includes the influence of the teachers' gender on his/her teaching approaches, classroom, potential gender biases, stereotype threats and lack of physics female teachers as role models. The study was concluded with some recommendations: teachers should be provided with professional development on how to adopt their teaching styles to meet the needs of all students regardless of their gender, policy makers and administrators should consider ways to support and encourage women in the field of physics, schools should make effort to increase the representation of female physics teachers in order to provide more role models for students.

Keywords: Achievements, effect, gender, students, teachers

Production of 21st century skilled students in Tanzania: A myth or reality?

Juma, A. A.

Southwest University-China, Faculty of education,
Department of Educational Leadership and Management
The Dodoma University Tanzania- Department of Education Management and Policy
Studies (EMPS)

Corresponding Author: aminatsd2013@gmail.com

ABSTRACT

Many university and college students worldwide graduate from their studies without acquiring 21st-century skills. In developing countries, the situation is more alarming. This study investigated how Tanzania's university students practiced these skills to determine the degree of students' acquisition of 21st-century skills. The practice theory was employed to frame analysis and discussion. Methodologically, a convergent parallel mixed-method design was used, and data was gathered simultaneously. Six department heads and 500 senior undergraduate students from the Universities of Dar es Salaam and Dodoma made up the sample. SPSS and Microsoft Excel were the software programs utilized for data analysis. The study revealed that the 21st-century skilled students' production at Tanzania universities is a myth because 96% of students still need exposure to education in skill development. In contrast, just 4% have shown significant practice in 21st-century skills. The study concluded that for the best output for students with 21st-century skills, all stakeholders must play their roles responsibly to guarantee that students acquire 21st-century skills ready for success in the present global labor market.

Keyword: Critical thinking skills, creativity skills, collaboration skills, communication skills, digital literacy.

Attachment-based parenting intervention for teenage students in Western Kenya: Does the connect parenting program work?

¹Mbagaya C. V. and ²Ayiro L. M.

Department of Educational Psychology, Maseno University, Kenya.

Department of Educational Psychology, Moi University, Kenya

Corresponding Author: cmbagaya@gmail.com

ABSTRACT

The Sustainable Development Goal 4 (SDG 4) envisages that by 2030, all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes. Unfortunately, many children are unable to complete the primary and secondary school education cycle due to factors associated with parenting. Research has shown that poor parenting skills is associated with problem behavior among teenagers. This in turn has been associated with lower school engagement, lower academic scores and school drop-out. Currently, a lot of research on improving learner outcomes in Kenya is focused on enhancing schoolbased factors, yet research shows that optimum parenting also enhances child outcomes. It is therefore important to equip parents with relevant parenting skills to achieve this end. The purpose of this study therefore was to determine whether Connect Parenting Program (Moretti, 2020) was a relevant strategy in enhancing positive behavior among students in Kenya. This program is based on the attachment theory and involves 10 group sessions spread over 10 weeks. Learning during each of the sessions is anchored on nine attachment principles. In this qualitative study, two 11- member groups of care-givers who were actively parenting teenagers in Kisumu and Bungoma Counties, Kenya were involved in the program. These caregivers were mainly grandmothers, aunties, mothers to the teens in reference. As guided by the Connect Parent Program Manual (Moretti, 2020), we used reflection exercises and adapted role plays as illustrated in the Manual to enhance understanding of the principles. After the sessions, qualitative data on the efficacy of the program was collected using interviews and focus group discussions. This data was transcribed, coded, analyzed thematically and reported in themes as they emerged. Results showed that the modified program fit the Kenyan cultural context. In addition, parents reported more positive relationships with their teenagers and less behavior problems. This study recommends a roll out of the Connect Parent Program in Kenya.

Keywords: Behaviour, intervention, learner outcomes, parenting

The coming of age of open and distance learning in higher education in Kenya and its potential impact on equity

Maritim K. E.

The Open University of Kenya, Konza Technopolis, P. O. Box 2440-00606,

Kenya

Corresponding Author: ekmaritim@yahoo.com

ABSTRACT

One thing that was inherited from colonial education system is the place of equity in access to education opportunities at all levels and since independence the cure of this phenomenon has remained elusive. It is in this context that this paper focuses on the evolution, nature and promises of open and distance learning on promotion and enhancement of equity in higher education. The paper seeks to track through online and offline literature on educational practices and policies and their impact on the provision of open and flexible learning. First, I wish to give a conceptually brief but rich overview of distance learning and its encapsulation in education policy framework. Second, examine the impact and lessons from 22 years of existence of African Virtual University (AVU) in Kenya. Third, review the fundamental web of challenges and failures of adoption and adaption of open and distance learning in dual mode universities. Fourth, situate the development of open and distance learning institutions within the context of socio-political expediency. Finally, I wish to argue that the openness and the flexibility in our new learning ecosystem unlocks avenues for the skills development and employment potential for those who have been denied such lifelong opportunities.

Keywords: access, distance learning, dual mode institutions equity, learning ecosystem

Influence of education on adoption of technology, innovation and good management practices by poultry farmers in Nakuru County

Wamukuru, K. D.

Egerton University, Faculty of Education and Community Studies, Department of Curriculum and Instructions,

Egerton

Corresponding Author: dwamukuru@egerton.ac.ke

ABSTRACT

Use of technology is an important component in enhancing agricultural productivity. This study sought to investigate the influence of formal education on adoption of technology, innovation and good management practices (TIMPs) by poultry farmers. The study adopted ex-post-facto research design. Data was collected through a closed ended questionnaire from a purposive sample of 263 poultry farmers and analyzed using simple liner regression. From the model, the correlation coefficient (R) was 0.619, indicating a moderate positive correlation between education and adoption of TIMPs. The regression model, predicting adoption of TIMPs based on education, substantiated a statistically significant effect (t = 6.162, p = 0.000), prompting the rejection of the null hypothesis. The constant (B = 0.210) denoted the estimated adoption of TIMPs when education level is zero. The coefficient for the adoption of TIMPs (B = 0.765) signified a positive association, suggesting that as education level increased, adoption of TIMPs increased by 0.765 units. Overall, the findings supported the alternative hypothesis, indicating a meaningful and statistically significant effect of education on adoption of TIMPs. The study concluded that, level formal education influenced level of adoption of technology, innovation and good management practices among poultry farmers. The study recommends for promotion of adult education among poultry farmers without formal education to enhance their capacity and productivity.

Keywords: Innovation, management practices, technology

Knowledge, attitude, beliefs and practice of COVID-19 among school learners in Kenya

*Chepchieng, C. M., Ngure, K. P., Raburu, A. P., Mburugu B. M., Kung'u, L., Mbutitia, F., Kangethe, M., Gitau, S., Maina N. G. and Avisa, H.

Department of Curriculum and Instruction, Egerton University, P. O. Box 536, Egerton

Corresponding Author: mchepchieng@egerton.ac.ke

The first case of COVID-19 in Kenya was confirmed in March 2020. Upon confirmation in Kenya, the Ministry of Health (MoH) through the National Emergency Response Committee on Coronavirus (NERCC) implemented a mix of public health response measures. No study has been conducted in Kenya to establish the knowledge, attitude, beliefs and the preventive behaviours of the pandemic among primary and secondary school learners. Across-sectional descriptive study was conducted where a total of 2798 learners across five counties of Kenya responded to the knowledge, attitude, beliefs and practice (KABP) questionnaire. The data collected was analyzed using both descriptive and inferential statistics, and tested at α =.05. The findings revealed that over 96% of the respondents were able to correctly identify the signs, symptoms and prevention measures of COVID-19. Also, statistical insignificance (χ^2 = 8.171 p < .05) existed between counties and the learners' knowledge on prevention methods of COVID-19. On attitude, statistical significant differences ($\chi^2 = 65.79 p < 10^{-2}$.05) existed between counties in the learners' attitude towards COVID-19. However, statistical significant differences (χ^2 = 34.710, p < .05) was found between primary, secondary and special school learners' attitude towards COVID-19. It was established that no significant gender difference (F=2.719, p>.05) existed in the beliefs of COVID-19. Practices towards COVID-19 were statistically associated with knowledge, attitudes and beliefs toward the disease. It was concluded that practices of preventive behaviours among learners can be affected by knowledge, attitudes and beliefs. In effect, these aspects should be considered during pandemics.

Keywords: Attitude, belief, COVID-19, knowledge, practice, school learners

SUB-THEME 3

Literature, Language, Culture, Communication and the Creative Economy

Implications of Kenyan newspaper ownership patterns on news selection and the place of environmental and climate change stories

Otieno M. O., Mareri A. L. and Khaemba M. J.

Department of Literature, Languages and Linguistics

Egerton University, Kenya

Corresponding Author: motienofsc@gmail.com

ABSTRACT

This study aims to investigate the influence of newspaper ownership on news selection and the place of environmental stories in Kenyan mainstream newspapers. The study was informed by one objective; to investigate the factors that influence news selection and hinder environmental and climate change coverage in Kenya. This study employed a qualitative methodology using a phenomenological research design. Purposive sampling was employed to select a sample size (N=15) made up of editors and reporters. Semi-structured in-depth interviews were used to collect data, which were analyzed using a qualitative thematic analysis. This study revealed that the media landscape in Kenya plays a major role in influencing editorial decisions on news selection by Kenyan newspapers. The study further revealed that media ownership and inexperienced reporters are the main factors hindering environmental coverage in Kenya. These findings have implications for the media industry, environmental organizations, and policymakers, ultimately promoting more effective strategies for environmental and climate change information dissemination, with potential applicability in regions facing similar challenges. The study recommends further research to scrutinize the criteria employed by editorial boards in news selection and the need to train reporters on environmental and climate change coverage and reporting in Kenya.

Keywords: Climate change, environmental stories, Kenya, media ownership and newspapers

Effects of political experience on participation of young women in political processes in Nyamira South Sub-County, Kenya

¹Onyancha M. R., ¹Chesikaw L., ¹Obonyo J. and ²Wambu C. ¹Egerton University, Egerton, Kenya. ²The Co-operative University of Kenya, Karen, Nairobi. Corresponding Author: rachaelmoraa783@gmail.com

ABSTRACT

The Constitution of Kenya 2010, offers young women key entry points for engagement in political processes through elective and appointive positions. Young women's political participation through various forms of activism in both formal and informal political institutions allows them to gain platform and experience in the decision making process. However, politics is viewed to be a domain for older and mature people especially older men and older women limiting young women's participation. The study therefore, sought to investigate the effects of political experience on participation of young women in political processes. The study was informed by the radical feminist theory. The study adopted the descriptive research design. The target population was 76,392 registered voters, in Nyamira South sub-county. A sample size of 157 participants was selected. Stratified and simple random sampling was used to select the participants from the strata. 8 key informants were also included in the study. Data was collected using respondent's survey questionnaires and key informant interviews schedules. The study findings indicated that participation of young women in political processes was significantly influenced by political experience. The study identified lack of political experience, fear of violence and lack of financial support and patriarchy as hindrances to young women's political participation. The study therefore recommends implementation of the affirmative action, use of technology, training and mentorship programs for young women on leadership and governance.

Keywords: Participation, political experience, political processes, young women

SUB-THEME 4

Trends in Science, Technology, Engineering and Mathematics

Investigation of voltage stability of power distribution network in Nairobi Region

¹Kithaka, K. E., ²Maina, M. C. and ³Ngoo, L. Corresponding Author: edwardkithaka@gmail.com

ABSTRACT

In recent years, load demand has grown in the Nairobi area Power distribution Network due to rising population growth in the city. Despite the increase in generation and transmission capacity, the supply and load demand has not been matched due to various economic, environmental and topological constraints. This has resulted in constant system stabilities since the system is operated at stressed conditions. During electricity distribution, voltage instability can result in the breakdown of the distribution system if the voltage drops below a level that cannot be recovered. Therefore, this led to the need to perform voltage stability analysis in order to operate within the safe limits of the power demand. This project proposed a more accurate approach for voltage stability analysis which combines QV nodal analysis, sensitivity analysis and power-voltage curves for the study and analysis of static voltage stability of the Nairobi region distribution network. First the main components of the power system network are determined and their characteristics listed down. The main components include transformers, distribution lines and power generations, feeders and loads. The line diagram is drawn and using PSAT, the load flow analysis is performed in order to determine the demands and safety stability operating limits of the voltages The current 66kv voltage lines in Nairobi region under the average peak loading conditions during the month of January 2023 is considered for the study. The paper also reviewed existing conventional methods and their limitations.

Keywords: Load flow analysis, voltage instability, sensitivity analysis

Influence of bulk defect density in CIGS on the efficiency of Copper Indium Gallium Selenide photocell

Mosiori, C. O.

¹Department of Mathematics and Physics, School of Applied and Health Sciences, Technical University of Mombasa,
Box 90420 - 80100, Mombasa, Kenya.

Corresponding Author: corori@tum.ac.ke

ABSTRACT

In CIGS-based thin-films, bulk defects are believed to represent disturbances either in a regular, periodical arrangement within the atoms or within the crystalline media which influence sheet resistivity. In this study, first a resistivity measurements were carried out on CIGS thin films using the Van Der Pauw technique. Then, a comparison between two Van Der Pauw fourpoint measurement configurations (aligned and square) were done which showed that the square configuration was the most appropriate configuration that can be recommended to measure thin film sheet resistance of CIGS films. Finally, a numerical simulation using SCAPS-1D software was used to study the influence of bulk defect density in a CIGS films as an absorber layer in a model photocell. Using the simulated data, three operating zones for the model photocell were identified depending based on the concentration of its bulk defect density. The influence of bulk defects on thickness, band gap and doping were then analyzed. It was revealed that when the bulk defect density was less than 5×10^{13} cm⁻³ for an absorber of thickness in the order of over 3 μm, a band gap between 1.3 eV-1.4 eV and acceptor density of 10¹⁶ cm⁻³were the optimal operating conditions for the model photocell. It was concluded that the CICS layer used as an absorber can be improved if its bulk defect density is tuned to optimal levels.

Keywords: CIGS thin films, resistivity, van per pauw technique, SCAPS-ID software

Water quality assessment of tap and kiosks water supply systems in Lodwar town in Turkana County, Kenya

*Ekwar, E. P., Muia, W. A. and Nzula, K.
Department of Biological Sciences, Egerton University,
Kenya

Corresponding Author: paulekwar@gmail.com

ABSTRACT

Growing urban areas in developing countries face water access challenges from inadequate urban water supply systems against growing water demand. Water utilities like in Lodwar establish kiosks supplies to fill water supply gaps especially in peri-urban areas and informal settlements. However, quality of many urban water supply systems is uncertain due to several factors. This study assesses selected physical-chemical parameters and faecal coliform densities in water across piped and kiosks supply chains from the source to consumers in Lodwar town. Electrical Conductivity (EC), pH, temperature, and Total Dissolved Solids (TDS) were determined by universal meters Model HACH HQ 40d; HACH HQ 30d for Dissolved Oxygen (DO) and HACH HQ 11d for turbidity. NO₃-N, was determined by calorimetric method using light spectrophotometer (420nm wavelength). Free Residual Chlorine (FRC) was analysed using Pool tester with standard colour scales FRC concentrations. Faecal coliforms were determined by Membrane Filtration Technique (MFT) using Oxfam- DelAqua water testing kit. SPSS statistical software at a significance level of 0.05 using One-Way ANOVA was used to test difference of water quality parameters across supply chains. Temperature (28.51-32.46°C), DO (3.78-7.50mg/L) and pH (7.58-8.38) were significantly different (p<0.05) across all supply chains while, faecal coliforms (6.40-340.79CFUs/100mL) were significantly different (p<0.05) across piped water supply chain using one-way ANOVA test. Nitrate (0.052-0.068mg/L) was significantly different (p<0.05) across kiosks supply chain using one-way ANOVA test. The faecal coliforms in all supply chains recorded higher values than WHO standards for drinking water (0 CFUs/100mL) hence contaminated water. Inadequate water treatment, poor hygiene, improper water handling, lack of water quality monitoring and poor maintenance of piped system influenced water quality in Lodwar town. Face al coliforms increased across all supply chains hence grossly contaminated and posing waterborne health risks to consumers. Regular water quality monitoring and treatment at the source and storage tanks are required to improve its quality.

Keywords: Faecal coliform, monitoring, supply chain, water quality

Effects of antenna orientation on line of sight radio channel for microwave links: A case of Busia County, Kenya and a case of Oromia Region, Ethiopia

*1 Mwalali, J., 1 Oyie N. and 2 Asiyo M.

1 Murang'a University of Technology
2 Kenyatta University

Corresponding Author: jacklinemwikali87@gmail.com

ABSTRACT

Rain attenuation is one of the major issues facing the propagation of electromagnetic waves (EM) in the microwave radio networks. The case becomes worse with the millimeter-wave (mmW) bands as they are characterized by small waveforms and high decrease in electromagnetic wave power density (path loss). The close physical size of the raindrops with the wavelength of the mmW bands leads to severe degradation in the received signal level (RSL). Thus, this paper studies the impact of rain attenuation on line of sight (LOS) microwave communication links with dynamic antenna polarization. The rainfall being a natural and time-varying phenomenon, its induced attenuation increases with frequency and varies from year to year and from region to region. In this paper, data on RSL is collected, analyzed and presented for different antenna orientation under rainy condition and no rainy condition from four sites in Busia County, Kenya and two sites in Oromia region in Ethiopia. From the measurement data, it has been observed that the rain attenuation affects horizontally polarized (HP) microwave links more than the vertically polarized (VP) ones. Path loss propagation models such as Floating Intercept (FI), Alpha, Beta and Gamma (ABG) and Close-In (CI) models have been used to model the links based on the measurement data. In conclusion, a dynamic dual polarized microwave antenna is proposed and is projected to be able to provide up to 99.999% channel availability under varying weather conditions.

Keywords: Millimeter wave, line of sight, microwave radio, RSL, horizontal & vertical polarization.

Optimization of engine performance and emissions fueled by biodiesel blends

¹Kibiwot V. N., ¹Nyaanga D.M., ¹Njue M. R, ²Owino G. O. ¹Egerton University, Faculty of Engineering P.O Box 536-30100, Egerton, Njoro, Kenya.

²Technical university of Kenya, P.O. Box 52428 - 00200, Haile Selassie Avenue, Nairobi, Kenya.

Corresponding Author: vkibiwot@egerton.ac.ke Tel. 254720258346

ABSTRACT

Compression ignition (CI) engines are most widely used as power plant for many applications, like automotive, agricultural purposes, portable machines and remote location power generation, because of their higher torque, power output, energy content per unit mass and cost of fuel. Unfortunately, CI engines use diesel, to produce greenhouse gases (GHG) emissions polluting the environment, leading to global warming and harmful to humans. Presently, due to the stringent GHG emission regulations and depletion of fossil diesel reserves, researchers are continuously seeking for alternate fuel for CI engines to replacing the fossil diesel. Biodiesel has been the preferred alternative fuel due to its benefits of reducing GHG emissions the CI engines and used with little or no modification. Biodiesel blends with diesel, were introduced to mitigate its decreased engine performance, unfortunately, it has been a difficult to obtain the best blend mix ratios for optimal engine performance and emissions, since biodiesels are sourced from a variety of vegetable oils whose fuel parameters and interactions differ considerably, causing variation in their combustion processes. The study has proposed prediction performance and emissions models validated using Variable Compression Ratio (VCR) engine to test running on different biodiesels' blends. Non-Dominated Sorting Genetic Algorithm II (NSGA II) evolutionary multi-objective optimization was used to establish the best biodiesels blends mix ratios to maximize engine performance and to minimize emissions. NSGA II established the best blend level to be at 22.5, 21.9, 20.6, 19.98 and 19.6 % for WVO, canola, coconut, sunflower and oleander.

Keywords: Optimizations, engine performance and emission, biodiesel blends.

Efficiency of a stand-alone recirculating aquaculture system in increasing fish production in a lower-middle income country, Kenya

*Erick, O. J., Ong'ondo, O. G. and Otachi, O. E.

Department of Biological Sciences, Egerton University,
P.O Box 536- 20115 Egerton.

Corresponding Author: johneric563@gmail.com, +254 714352793

ABSTRACT

The per capita fish consumption is 20.3kg, 8.9kg and 4.5kg in the world, Africa and Kenya respectively. Kenya, a country with abundant aquatic resources and great potential for aquaculture has a low fish consumption, because of low production. This study assessed the production potential of a stand-alone recirculating aquaculture systems (RAS) in a region in Kenya. The fish were grown in two systems: an earthen pond (300m² at 3 fish/m³) as a control and the intensive FisHub model RAS (50m² at 120 fish/m³). The fish were fed on locally manufactured complete feeds. The fish were sampled (30% of the stock) 3 times: T₀ (at stocking), T₁ (30 days) and T₂ (60 days). The fish's weight was determined in each sampling. Assessment of the dissolved oxygen, temperature, pH, ammonia and nitrate and stocking densities levels in the culture system were then used to determine the efficiency and productivity. Productivity in the FisHub was significantly higher than in the pond (Mann-Whitney U test, p<0.01) with yields of 13.3kg/m³ and 0.8kg/m² respectively. Using multiple linear regression analysis, lack of control in Oxygen (p<0.01) and temperature (p=0.042) levels in the morning and the overall pH (p=0.039) had significant effect on the productivity in the system. The results of this study revealed that the stand-alone RAS has a great potential to increase fish production in Kenya and a cost-benefit analysis of the system is recommended.

Keywords: Recirculating aquaculture system, efficiency, fish, production

Overlap in habitat exploitation between catadromous anguillids and higher trophic level sympatric fishes in Kenyan east flowing rivers

¹Tembo, K. J., ¹Kihia, M. C., ¹Kitaka K. N., ²Gordon O'Brien, ³Céline Hanzen, ⁴Emmanuel Mbaru, ¹Kariuki C.

¹Department of Biological Sciences, Egerton University, P.O. Box 536-20115, Egerton, Nakuru, Kenya; ²School of Biology and Environmental Sciences, University of Mpumalanga, South Africa. ³School of Life Sciences, University of KwaZulu Natal, RSA

⁴Kenya Marine and Fisheries Research Institute, Kenya. **Corresponding Author:** japhetembo@gmail.com

ABSTRACT

In the broad sense, river habitat includes all the physical, chemical and biological characteristic structures in rivers. Habitat types therefore forms a key component of ecosystems, playing major role in determining biotic assemblages, resource portioning in ecological food webs and river integrity. However, freshwater eels traversing oceanic and freshwater habitats throughout their range of upstream catchments to mid ocean plateau, are vulnerable to multiple natural and human stressors. Biotic interactions such as habitat overlaps are of considerable importance but remains poorly explored. An evaluation of fish assemblages in varying habitat types and environmental variables was carried out at Athi-Galana-Sabaki and Ramisi rivers. The study evaluated fish in different habitat captured using Fyke nets from April 2021 to March, 2022. Results indicated that among the fish types evaluated, sympatric fishes were prevalent in pools (57%). Eels were similarly dominant in pools (84%), overlapping with sympatric fish, demonstrating habitat type overlaps. Permutational multivariate analysis of variance (PERMANOVA) revealed no effect on habitat types association between fish type assemblages (F=0.69, p=0.81). Furthermore, habitat type selection among fish was not significant different (F=0.02, p=0.99), indicating a degree of similarity in habitat exploitation by the populations. Canonical correspondence analysis (CCA), with (CCA 1 and 2) accounted for (45%) and (32%) respectively revealed that conductivity (EC), total dissolved solids (TDS), discharge (m³/s), temperature (°c), pH, salinity (ppt) and dissolved oxygen (TDS) (mg/L) had a significant

relationship within fish type assemblages. This study demonstrated that, different fish types and species preferred different environmental variables potentially due to differences in ecological requirements. Although habitat type did not affect overall fish assemblages, habitat heterogeneity played an important role in fish diversity for both eels and sympatric. Hence, maintaining diverse river habitats is critical for vulnerable fish conservation and sustainable management of rivers.

Key words: Environmental variables, fish assemblages, habitat overlap, habitat types and resource partitioning

SUB-THEME 5

One Health Approach,
Health System
Management, Health
Financing, Pandemic
Preparedness and
Surveillance

Placental metrics and their relationship with infants birth weight, gestational age and Maternal Body Mass Index in Southern Busia, Western Kenya

¹Odhiambo, C., ^{2,5}Chumbe S., ¹Makandi, R., ¹Imbusi G., ¹Sikuku D., ³Kipchirchir, D., ^{1,5}Wakoli, D. M., ⁴Chimwani, E., ^{1,5}Ondigo, B. N.

¹Department of Biochemistry and Molecular Biology, Egerton University, Kenya; ²Department of Biological and Physical Sciences, Maseno University ³Department of Biochemistry, Jomo Kenyatta University of Science and Technology; ⁴Department of Health Sciences, Jaramogi Oginga Odinga University of Science and Technology, Kenya; ⁵Center for Global Health Research, Kenya Medical Research Institute, Kisumu

Corresponding Author: odhiambocaleb395@gmail.com

ABSTRACT

Malaria infection during pregnancy can disrupt placental circulation and impair placental function, leading to reduced infant birth weight. Placenta metrices are the significant indicators of placental function and perinatal outcome. However, the precise impact of placental malaria and related changes in placental metrics on term delivery and birthweight remains unclear. This study aimed to assess placental metrics and their association with infant birth weight, gestational age, and maternal body mass index (BMI) in Southern Busia, Western Kenya. This Cross-sectional study leveraged on 133 fresh placentae, neonates and pregnant women who delivered at Port Victoria and Sio Port Sub County hospitals in Southern Busia, between May and August 2023. Maternal and neonatal characteristics were obtained from medical record books. A weighing scale, and a ruler were used to obtain infant, maternal and placental metrices (weight, long and short diameter, and thickness). Univariate linear regression was used to assess the association between infant birth weight and each placental metric. Additionally, multivariate linear regression was fitted to analyze the relationship between infant birth weight, gestational age and maternal BMI. Out of 133 placental samples,110 (82.7%) were uninfected with malaria, while 23(17.2%) were infected. The mean birth weight of term infants infected and uninfected with malaria was 3129g (95%CI; -256.2-248.2,) and 3125g, respectively(P=0.63). Although not statistically significant, infants infected with placental malaria exhibited lower mean placental weight (444.3g), the longest placental diameter (19.80cm), and placental thickness(2.04cm) (P=0.71, P=0.88, and P=0.26, respectively). Birth weight positively correlated with placental weight (R² =0.36, p<0.0001), largest placental diameter (R^2 =0.27, p =0.002), placental volume (R^2 =0.23, p=0.005) and maternal BMI (R² =0.19, p=0.023). However, there was no significant association between birth weight and gestational age (R2 =0.25, p=0.77). The birthweight/placental weight

(BW/PW) ratio and placental weight/birthweight (PW/BW) ratio both exhibited positive correlation with birth weight in both placental malaria-infected and uninfected infants (R² =0.8, P<0.0001, R² =0.9, p=0.017). Notably, the odds ratios between placental malaria infection and birth weight, placental metrics, gestational age and BMI remained at 1(Odds Ratios [OR] 1.000; 95%CI;0.9998-1.001). While a significant correlation exists between placental weight, the longest placental diameter and BMI with birthweight, this relationship appears to be independent of placental malaria infection. Therefore, further investigation is warranted to explore other potential factors that influence healthy pregnancy and birth outcomes, enabling more effective public health concerns.

Keywords: Basal metabolic index (BMI), birth weight, gestational age, placental metrics

Antidermatophytic Quinolizidine Alkaloids from *Calpurnia aurea* subsp. *aurea* (Aiton) Benth

^{1,2,3,4}Wanga, L. A., ²Indieka, A. S. and ^{*1}Matasyoh, J. C. ¹Department of Chemistry, Faculty of Sciences, Egerton University, P.O. Box 536, 20115, Egerton, Kenya

²Department of Biochemistry and Molecular Biology, Faculty of Sciences, Egerton University, P.O. Box 536, 20115, Egerton, Kenya

³Department of Microbial Drugs, Helmholtz Centre for Infection Research, 38124 Braunschweig, Germany

⁴Institute of Microbiology of the Czech Academy of Sciences, VIDENSKA 1083, PRAHA 4 142 00, Czech Republic

*Corresponding Author: jmatasyoh@egerton.ac.ke

ABSTRACT

From the leaves and stem bark of the Kenyan medicinal plant *Calpurnia aurea* subsp. *aurea*, four previously undescribed quinolizidine alkaloids namely, 2β -methoxy- 13α -O-(2'-pyrrolylcarbonyl) virgiline, 2α -methoxy- 13β -O-(2'-pyrrolylcarbonyl) virgiline, 3α -O-angelate- 2β -hydroxy- 13α -O-(2'-pyrrolylcarbonyl) virgiline, 2,3-dehydro-virgiline were isolated together with four known ones. Structural elucidation of the compounds was based on 1D and 2D NMR spectroscopy and mass spectrometry. Their relative configurations were determined by NOESY correlations and literature. The quinolizidine alkaloids were tested against *Trichophyton rubrum*, *Trichophyton interdigitale*, *Trichophyton benhamiae*, *Microsporum canis* and *Nannizzia gypsea*, common causative agents of most of the tinea infections in human. All the isolated quinolizidine alkaloids exhibited antidermatophytic activity with MIC ranging from $37.5 \mu g/ml$ to $300 \mu g/ml$.

Keywords: Calpurnia aurea subps aurea, Fabaceae, antidermatophytic activity, Quinolizidine alkaloids, Dermatophytes,

Specificity and sensitivity of microscopy and Malaria Diagnostic Kit (mRDT First Response™) among pregnant women presenting for delivery in Southern Busia, Western Kenya

¹Kipchirchi D., ²Wakoli D.M., ²Daniel S., ³Odhiambo C., ⁴Chimwani E., Chumbe ⁵ S., ²Makandi R., ¹Bargul J. L. and ³Ondigo B. N.

¹Department of Biochemistry, Jomo Kenyatta University of Agriculture and Technology, Kenya

²Department of Biochemistry and Molecular Biology, Egerton University,
 ³Department of Biochemistry and Molecular Biology, Egerton University, Kenya,
 Center for Global Health Research, Kenya Medical Research Institute, Kisumu
 ⁴Department of Health Sciences, Jaramogi Oginga Odinga University of Science and
 Technology, Kenya

⁵Department of Biological and Physical Sciences, Maseno University **Corresponding Author**: dicksonkosgei15@gmail.com

ABSTRACT

Placental malaria is caused by infiltration of malaria-infected erythrocytes into the placental intervillous space during pregnancy. Effective malaria treatment relies greatly on diagnosis, a main support of malaria control and elimination efforts. All suspected cases of malaria should be confirmed using microscopy or malaria rapid diagnostic tests (mRDTs). This study sought to investigate the prevalence of malaria in pregnant women presenting for delivery at Port Victoria and Sio-Port Sub-County Hospitals using microscopy and mRDT techniques. Pregnant women presenting at Port Victoria and Sio Port Sub County hospitals for delivery between April and October 2023 were enrolled in this cross-sectional study after consenting. About 2 mL of peripheral blood was collected from 236 women for the detection of gestational malaria using microscopy and mRDT. Placental blood was also collected for the placental malaria screening using microscopy. Maternal hemoglobin was determined using Mission plus® HB machine. The measure of agreement (Cohens Kappa statistic) between microscopy and mRDT was also calculated. Almost half, 114 (48.3%) were from Sio Port sub-county Hospital while 122 (51.7%) were from Port Victoria Sub-County Hospital. Participants mean age was 24.0 ± 5.9 years. 39/236 (16.5%) and 52/236 (22.0%) of peripheral blood samples collected at delivery were positive for malaria by microscopy and mRDT, respectively. 27/236 (11.4%) of placental blood samples were malaria positive by microscopy. The mean HB was 10.2 ± 1.8 and blood group O+ was the most prevalent. Additionally, Anemia was significantly reported at a prevalence of 196/236 (83.1%), P < 0.0001). A fair agreement between microscopy and mRDT was also shown (Kappa = 0.25). Malaria infection intensities were 8 (20.5%), 14 (35.9%), 13 (33.3%), and 4 (10.3%) for very

low, low, moderate, and high parasitaemia, respectively. To prevent active transmission and adverse effects of malaria in pregnancy, diagnosis has to be prompt and done during routine Antenatal clinics (ANC) and at delivery.

Keywords: Placental malaria, gestational malaria, microscopy, malaria rapid diagnostic tests (mRDT)

Predictors of mortality among patients on maintenance hemodialysis attending Nakuru County Referral and Teaching Hospital

¹Abere M. Z., ¹Nzioki, G. Y., ¹Okeyo O. S., ¹Akinyi, B. W., ¹Supat T. F., ¹Mohamed. A, ¹Wanjiku, W. T. and ²Omenge, O. R.

¹Egerton University, Faculty of Health Sciences, Department of Medicine, Medicine and Surgery, P.O. Box 536-20115 Egerton University-Njoro, Kenya.

²Egerton University, Faculty of Health Sciences, Department of Community Health, P.O. Box 536-20115 Egerton University-Njoro, Kenya.

Corresponding Author: zacharyabere@gmail.com

ABSTRACT

Hemodialysis is one of the main treatment options for patients with end-stage renal disease and chronic kidney failure. However, the number of patients dying while on maintenance hemodialysis has been due to multiple reasons either secondary to the hemodialysis process or due to complications of end-stage renal disease. These predictors of mortality among hemodialysis patients seem to differ based on geographical regions and even county-to-county. This study aimed to determine the specific predictors of mortality among patients at Nakuru Teaching and Referral Hospital. A descriptive cross-sectional study was done among patients on maintenance and medical records review of patients' demographic, clinical, biological, and anthropometric data between January 2017 and January 2022. Statistical analyses with the assistance of Statistical Package for the Social Sciences (SPSS) version 29.0 software program (SPSS). The hazard proportional regression analysis model was done for association on survival time of patients. The study findings indicate: that the year 2022 had an uptake trend of females (59.4%) compared to males (40.6%). Cox proportional hazard regression model and Kaplan survival curves analysis revealed that cardiovascular disease (hazard ratio (HR) =0.73), hypertension (HR=0.88), diabetes (HR=0.77), pneumonia (HR=2.25), and HIV (HR=1.56) as independent predictors of mortality among hemodialysis maintenance patients. Also noted was poor medical records documentation and loss of records over time. The study recommends interventions such as early initiation of medical treatment of comorbid conditions, to reduce the mortality rate of patients in their first year of hemodialysis initiation, and public education on uptake of maintenance hemodialysis among patients with end-stage renal disease. And adopting electronic health records (EHRs) to improve documentation, storage, and available patient data for health research.

Keywords: Chronic kidney failure, end- stage renal disease, hemodialysis

Impact of parasite genomic dynamics on the Sensitivity of *Plasmodium falciparum* Isolates to Piperaquine and other antimalarial drugs

¹Wakoli, D.M, ¹Ondigo, B.N, ²Ochora D.O, ³Amwoma, J.G., ³Okoth, R., ³Opot, B.H., ³Cheruiyot A.C, ³Juma, D., ³Akala, H.M.

¹Department of Biochemistry and Molecular Biology, Egerton University, Kenya, Center for Global Health Research, Kenya Medical Research Institute, Kisumu ²Department of Plant Sciences, Microbiology & Biotechnology, College of Natural Sciences, Makerere University, Kampala, Uganda

³United States Army Medical Research Directorate-Africa/Kenya (USAMRD-A/K), Centre for Clinical Research, Kenya Medical Research Institute (KEMRI), Kisumu, Kenya.

Corresponding Author: dancanwakoli@gmail.com

ABSTRACT

Dihydroartemisinin-piperaquine (DHA-PPQ) is an alternative first-line antimalarial to artemether-lumefantrine in Kenya. However, recent reports on the emergence of PPQ resistance in Southeast Asia threaten its continued use in Kenya and Africa. In line with the policy on continued deployment of DHA-PPQ, it is imperative to monitor the susceptibility of Kenyan parasites to PPQ and other antimalarials. Parasite isolates collected between 2008 and 2021 from individuals presenting with uncomplicated malaria were tested for in vitro susceptibility to piperaquine, dihydroartemisinin, lumefantrine, artemether, and chloroquine using the malaria SYBR Green I method. A subset of these samples was further tested for ex vivo susceptibility to PPQ using piperaguine survival assay (PSA). Each isolate was also characterized for mutations associated with antimalarial resistance in Pfcrt, Pfmdr1, Pfpm2/3, Pfdhfr, and Pfdhps genes using qPCR and Agena MassARRAY platform. Associations between phenotype and genotype were also determined. The PPQ median IC_{50} interquartile range remained stable during the study period (P=0.1615). The median ex vivo piperaguine survival rate (IQR) was 0% (0-5.27) at 95% CI. Five isolates had PSA survival rate of ≥10%, consistent with the range of PPQ-resistant parasites, though they lacked polymorphisms in Pfmdr1 and Pfpm2/3 genes. Lumefantrine and artemether median IC₅₀s rose significantly between 2008 and 2021 (P=0.0201). Conversely, chloroquine median IC₅₀s decreased significantly during the study period, coinciding with a decline in the prevalence of Pfcrt 76T allele over time (P=0.0357). The proportions of piperaquine-resistant markers; Pfpm2/3 and Pfmdr1 did not vary significantly. A significant association was observed between PPQ IC₅₀ and Pfcrt K76T allele (P=0.0026). Circulating Kenyan parasites have remained sensitive to PPQ and other antimalarials, though the response to artemether (ART)

and lumefantrine (LM) is declining. This study forms a baseline for continued surveillance of current antimalarials for timely detection of resistance.

Keywords: Antimalarial, drug resistance, falciparum, genomic, plasmodium, sensitivity

Microelement concentrations in baobab leaves from Sudan: Implications for human nutrition

^{1,2}Ahmed, E.M. A., ³Mozzon, M., ¹Shaikh, M. A., ^{4,5}Elshafia, A. H. M., ¹Kovács, B. ¹Faculty of Agric. and Food Sciences and Environmental Management, Institute of Food Science, University of Debrecen, Hungary; ²Faculty of Forestry, University of Khartoum, Postal Code 13314, Khartoum North, Sudan; ³Department of Agricultural, Food and Environmental Sciences, Università Politecnica delle Marche, Italy; ⁴Faculty of Agricure and Food Sciences and Environmental Management, Department of Animal Science, Debrecen, Hungary, ⁵Agriculture Research Corporation (ARC), Crop protection Research Center, Wadmadani, Sudan

Corresponding Author: ahmed.abdelhakam@agr.unideb.hu; +36202889031

ABSTRACT

The African baobab Adansonia digitata L. is an iconic tree native to the African continent, renowned for its nutrient significance. In Sudan, the nutritional potential of its leaves remains largely unexplored. This study presents a comprehensive analysis of microelement concentrations in baobab leaves collected from diverse geographical locations in Sudan. The leaf samples were collected from three various site types - Wetland (W), Plain land (P), and Mountain (M) in Sudan. Inductively Coupled Plasma Mass Spectrometry (ICP-MS) was used for the analysis of elements such as Copper (Cu), Iron (Fe), Manganese (Mn), and Zinc (Zn). One-way analysis of variance (ANOVA) was used to ascertain the influence of site types on elemental content at a 5% significance level. Fe was highest in site M (36 mg/100 g), while Mn was highest in site P (7.8 mg/100 g). Copper and zinc exhibited variations across the different sites and the highest mean concentration for both was observed in site W (1.0 mg/100 g) and (2.4 mg/100 g) respectively. The results revealed significant variations in microelement concentrations based on site type. These outcomes provide valuable insights into the nutritional composition of baobab leaves, indicating the potential applications in human dietary practices and supplementation strategies. Overall, this study contributes to understanding the nutritional value of baobab leaves in Sudan, with implications for human health and food security.

Keywords: Baobab leaves, nutrient, food security

Malaria prevalence and determinants of optimal intermittent preventive malaria therapy and insecticide-treated nets among pregnant women in Southern Busia, Kenya

^{1,3}Chumbe, S. A., ²Chimwani, E., ²Onguru, D., ³Wakoli, D. M., ³Odhiambo C., ³Sikuku W. D., ³Imbusi, G., ⁴Kipchirchir, D. and ³Ondigo, B. N.

¹Department of Biological and Physical Sciences, Maseno University, Kenya ²Department of Health Sciences, Jaramogi Oginga Odinga University of Science and Technology, Kenya; ³Department of Biochemistry and Molecular Biology, Egerton University, Njoro, Kenya; ⁴Department of Biochemistry, Jomo Kenyatta University of Agriculture and Technology, Kenya

Corresponding Author: stellachieng96@gmail.com

ABSTRACT

Pregnancy malaria is a significant public health concern, particularly affecting pregnant women. Three doses of sulfadoxine-pyrimethamine (SP) for intermittent preventive treatment of malaria in pregnancy (MiP) and the use of insecticidetreated nets are recommended for maximum protection. These interventions can avert the adverse effects of malaria in pregnancy-associated maternal anemia, intrauterine deaths, preterm delivery, and low birth weight (LBW). This crosssectional study was aimed at determining the prevalence of malaria and factors influencing the uptake of optimal doses of intermittent preventive malaria therapy and the use of insecticide-treated nets among pregnant women within the reproductive age of 15-49 years, attending antenatal and postnatal clinics in Port Victoria and Sio Port Sub County Hospitals, Busia County, Western Kenya. Quantitative data was collected from pregnant women and post-delivery women who consented from May to September 2023. Preliminary findings show that 168/303 (55.5%) of the women were from Samia sub-county. The participants mean age was 24.79 ± 5.95 years, 226/303(74.6%) were protestants, 233/303(76.9%) were married, 243/303(80.2%) were unemployed, 148/303(48.5%) had attained primary level of education and 197/303(65.0%) cited good relations with the healthcare workers. On knowledge, 38/303(12.5%) knew dangers of malaria in pregnancy, 130/303(42.9%) knew the optimal doses while 108/303(35.6%) knew when to start using IPTp-SP. The prevalence of malaria was 35.1% (95% CI: 29.7%- 40.5%). Optimal IPTp-SP uptake was 55.78% (95% CI: 50.1% - 61.3%) while ITN use was 98% (95% CI: 96.1%- 99.3%). Predictors of IPTp-SP optimization were the frequency of antenatal care (ANC) visits (P<0.001) and maternal knowledge of IPTp-SP start time (P< 0.02). Odds of optimizing IPTp-SP increased among women with ≥ 4 ANC visits (Odd Ratio = 5.30, 95% CI 3.0-9.39), and those with knowledge of IPTp-SP start time (Odd Ratio = 2.1, 95% CI 1.13–3.7). There were no significant predictors for ITN use. This study has

found a high prevalence of malaria and low IPTp-SP optimal uptake in the study area hence underscoring the need for targeted interventions.

Keywords: Intermittent preventive malaria, intermittent treatment malaria, pregnancy

Waterborne disease risk factors and intervention practices: A review

Mbinya W.

Department of Humanities and Social Sciences, Tharaka University (TUN)

Corresponding author: bnyaw2015@gmail.com

ABSTRACT

Waterborne diseases remain a major global public health issue and a great environmental concern, and the outbreak is common in African countries. Illness due to waterborne diseases causes morbidity and mortality in less developed countries among children aged below 5 years. This study was aimed at reviewing the literature on past and present studies on waterborne diseases, the risk factors, and the intervention practices. Review identified pertinent articles and reports through international databases such as Google Scholar, PubMed, Web of Science, China National Knowledge Infrastructure, and Science Direct. The search utilised key terms like waterborne diseases, risk factors, and intervention practices. The review focus spanned from 2005 to 2020, and the review encompassed sixty-one reports and journal articles that met the inclusion criteria. These publications discussed waterborne diseases, the contributing factors associated with them, and intervention practices. The review found that, the unavailability of piped water and the dependence of rural dwellers on surface waters, which are often contaminated with faecal materials, are the major causes of the rising prevalence of waterborne diseases. Poor hygienic practices have also been found to play a significant role in the spread of waterborne diseases. Besides, poor environmental practices, such as a lack of sanitation facilities, encourage the spread of liquid and solid waste within residential areas, contributing to the increasing number of waterborne illnesses. Improvements in drinking water, sanitation facilities, and hygiene practices in less developed countries have been suggested by many studies as key interventions to reduce waterborne diseases.

Keywords: Factors, GIS, interventions, water, waterborne disease

Overlap in habitat exploitation between catadromous anguillids and higher trophic level sympatric fishes in Kenyan east flowing rivers ¹Imbusi, G., ¹Wakoli M. D, ¹Sikuku, D., ²Kipchirchir D., ¹Odhiambo C., ³Chimwani E., ⁴Chumbe, S. and ¹Makandi R.

¹Department of Biochemistry and Molecular Biology, Egerton University, Kenya, Kenya, Center for Global Health Research-Kenya Medical Research Institute, Kisumu; ²Department of Biochemistry, Jomo Kenyatta University of Science and Technology; ³Department of Health Sciences, Jaramogi Oginga Odinga University of Science & Technology, Kenya; ⁴Department of Biological & Physical Sciences, Maseno University Corresponding Author: imbusig@gmail.com

ABSTRACT

In the broad sense, river habitat includes all the physical, chemical and biological characteristic structures in rivers. Habitat types therefore forms a key component of ecosystems, playing major role in determining biotic assemblages, resource portioning in ecological food webs and river integrity. However, freshwater eels traversing oceanic and freshwater habitats throughout their range of upstream catchments to mid ocean plateau, are vulnerable to multiple natural and human stressors. Biotic interactions such as habitat overlaps are of considerable importance but remains poorly explored. An evaluation of fish assemblages in varying habitat types and environmental variables was carried out at Athi-Galana-Sabaki and Ramisi rivers. The study evaluated fish in different habitat captured using Fyke nets from April 2021 to March, 2022. Results indicated that among the fish types evaluated, sympatric fishes were prevalent in pools (57%). Eels were similarly dominant in pools (84%), overlapping with sympatric fish, demonstrating habitat type overlaps. Permutational multivariate analysis of variance (PERMANOVA) revealed no effect on habitat types association between fish type assemblages (F=0.69, p=0.81). Furthermore, habitat type selection among fish was not significant different (F=0.02, p=0.99), indicating a degree of similarity in habitat exploitation by the populations. Canonical correspondence analysis (CCA), with (CCA 1 and 2) accounted for (45%) and (32%) respectively revealed that conductivity (EC), total dissolved solids (TDS), discharge (m³/s), temperature (°c), pH, salinity (ppt) and dissolved oxygen (TDS) (mg/L) had a significant relationship within fish type assemblages. This study demonstrated that, different fish types and species preferred different environmental variables potentially due to differences in ecological requirements. Although habitat type did not affect overall fish assemblages, habitat heterogeneity played an important role in fish diversity for both eels and sympatric. Hence, maintaining diverse river habitats is critical for vulnerable fish conservation and sustainable management of rivers.

Keywords: Environmental variables, fish assemblages, habitat overlap, habitat types and resource partitioning

15TH BIENNIAL INTERNATIONAL CONFERENCE Cooperative model in advancing health insurance scheme in Kenya

Wambu, C., Oboka, W.A., Waweru, K.M., Anyona, D., Maiyo,S., Nyamongo, I. K., Swardh,K., Bukachi,S., Obonyo, D. and Enns, C

The Co-operative University of Kenya, Karen, Nairobi.

Corresponding Author: ckamau@cuk.ac.ke, chkamau06@yahoo.com

ABSTRACT

Rural communities experience high prevalence of chronic illness which require proper medical attention which is very expensive. The role of agricultural cooperatives in promotion of gender responsive health care provision among smallholder farmers in Kenya cannot be downplayed. Agricultural cooperatives can be used as vehicles for promoting access to health care among its members but this opportunity is not fully tapped. This paper focuses on determining how agricultural cooperatives may advance gender-responsive healthcare. This study was conducted primarily in regions with well-established agricultural cooperatives, which include; Kiambu, Kajiado, and Taita-taveta. The study adopted cross-sectional descriptive research design with preference to mixed methods approaches. Probability methods was used to sample 509 respondents from a sampling frame of 6,800 active members in 18 agricultural cooperatives dealing with horticulture, coffee, and dairy constituted. Purposive sampling was used to sample respondents who participated in Focus Group Discussion and included; cooperative CEOs, representatives of the management board, and supervisory committees. Twenty-one (21) FGDS, (9 women-only, 9 men-only, & 3 mixed) were conducted. Data was collected using FGD guides and the household questionnaires. Both quantitative and qualitative methods of data analysis were used in tandem. Ethical consideration was put in place in the whole process of research. From the study findings there is a relationship between the number of dependents and health insurance enrollment, Pearson Chi-Square χ^2 (6, n=*509) =27.231, Pr.=0.000. There was a substantial correlation between enrollment in health insurance and income. Pearson chi2(6) = 22.4435 Pr = 0.001. To increase their efficacy in providing healthcare, agricultural cooperatives should amend their bylaws and policies to permit them to support the provision of healthcare among their members and to strengthen their connections with healthcare providers.

Keywords: Advancing, Cooperative Model, Health Insurance Scheme, Kenya

Health facility barriers to effective pain management in advanced breast cancer Kisii, Kenya

¹Maranga, A., ²Kimani, S. and ³Mwaura, J.

¹Egerton University Faculty of Health Sciences Department of Nursing Faculty of Agricultural and Food Sciences and Environmental Management, Institute of Food Science, University of Debrecen, H-4032, Böszörményi str. 138, Debrecen, Hungary

²University of Nairobi, College of Health Sciences, University of Nairobi Corresponding Author: alice.maranga@egerton.ac.ke

Safe, effective and evidence-based management of pain among patients with advanced breast cancer is a cornerstone for comprehensive cancer management. Despite increasing interest and efforts to improve pain management, pain remains poorly controlled in majority of patients with advanced breast cancer as a result of institutional and other barriers. To determine health facility barriers to management of advanced breast cancer pain by nurses. This was a mixed methods study which adopted a descriptive cross-sectional study design. The study was conducted at the Kisii County Referral Hospital, Keumbu Sub-County Hospital, Nyamemiso and Taracha dispensaries. The study population were nurses working at the Kisii County Teaching and Referral Hospital and hospital managers drawn from Kisii County Referral Hospital, Keumbu Sub-County hospital, Nyamemiso and Taracha dispensaries. Health facility barriers reported by nurses and hospital managers were; lack of supportive systems which included tight controls on opiod analgesics, strict prescription regulations, lack of quality improvement teams and pain specialties. Respondents perceived facility barriers were prescription limitations (29.8%), tight controls (25.0 %), severe side effects (17.9%) unavailability of opioid analgesics (41.7%), lack of quality improvement teams (54.4%), lack of pain specialists (18.5%) inadequate education, supervision and support (38.8%) and lack of guidelines for management of existential pain (100%). The health facility barriers reported by the respondents and affirmed by the hospital managers were; prescription limitations, tight controls, severe side effects, unavailability of opioid analgesics, lack of quality improvement teams, lack of pain specialists, inadequate education, supervision and support and lack of guidelines for management of existential pain were caused by the existing Ministry of Health and Kisii County Department of Health Policies The Ministry of health together with Kisii County Department of Health should review and change systematic regulations and policies to address the system barriers.

Keywords: Advanced breast cancer, barriers, pain

SUB-THEME 6

Environmental, Technical and Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society

The nature of drought and influence on cereal yields in Makueni County, Kenya

Ondiko, J. H., Karanja, A. M., Obulinji, H. W. and Ondimu, K. N.
The Department of Geography, Egerton University P. O. Box 536–20115 Nakuru,
Kenya.

amon.karanja@egerton.ac.ke, humpreyobulinji@yahoo.com, kondimu@egerton.ac.ke; Tel: +254 723 229 142

Corresponding Author: ondikojackob2018@gmail.com

ABSTRACT

Increasing frequency and severity of drought is a major challenge to rain-fed cereal production and productivity hence food insecurity in Arid and Semi-Arid Lands (ASALs). Further, the location of Kenya along the equator, Indian Ocean coastline and widespread ASALs that cover 80% of the country, significantly increase vulnerability of the smallholder cereal farmers to frequent and severe droughts. The increase in severity and frequency of droughts have resulted in food supply gap and faminerelated deaths in the past three decades despite drought management efforts by the Government of Kenya (GoK). The objective of this study was to establish the nature and effects of drought on cereal yields in Makueni County between 1990 and 2020. The study adopted Explanatory Sequential Mixed Methods Research Design. Rainfall data was obtained from Kenya Meteorological Department (KMD) for Makindu and Dwa Sisal Estate meteorological stations. Gridded rainfall data was also obtained from KMD for Kathonzweni and Salama meteorological stations. Standardized Precipitation Index (SPI) was used to establish the nature of drought while Pearson's r correlation analysis was conducted on rainfall and cereal yields. A survey on cereal farmers was also conducted to find out the cereal yield levels. The study established erratic, unpredictable and fluctuating rainfall patterns accompanied by 2 severe droughts, 1 moderate, 2 mild and 18 near-normal drought episodes. Frequent droughts in Makueni County resulted in low cereal yields where 43%, 42% and 60% of the cereal farmers produced between 1 to 10 bags of sorghum, finger millet and maize respectively. Information and data generated by the study is expected to result in better understanding of nature and effects of drought in Makueni County. This will enable achievement of the objectives of GoK and County Government of Makueni (CGoM) on improving adaptive capacity of the smallholder cereal farmers.

Keywords: ASALs, drought

Harnessing data driven decisions, the ethical dimension of climate change and the future generation

Mabururu, M. and Knowen, C. B.
Rongo University, P.O Box 103-40404, Rongo, Kenya
Corresponding Author: michealntabo@gmail.com

ABSTRACT

For a period of at least twenty years, there has been recognition of the detrimental impact of climate change on nearby and surrounding ecosystems. The phenomenon of climate change is presently exerting its influence on various aspects of human existence, including our immediate living environments. Moreover, it possesses the capacity to significantly alter the course of existence for forthcoming generations. This article will undertake a critical examination of the challenges posed by climate change, specifically focusing on issues such as water pollution, air pollution, deforestation, toxic waste disposal, and other environmental impacts. This worry will be informed by the notion that Kenya has made significant contributions to environmental deterioration, and that the severity of this crisis has reached alarming levels. Therefore, the preservation of this situation can only be achieved via dedication, selflessness, and the presence of capable and responsible leaders at every level. In conclusion, this study endeavors to assert that Kenya, as the host country of the United Nations Environmental Programme Headquarters, is anticipated to assume a prominent role in the realm of environmental conservation. The paper will make a critical discussion on how to leverage unprecedented climate change impacts for data driven decision for strategic implementations. It's the contention of the authors of this paper that Data analytics from the unstructured climate change indicators should be mined for the advantage of informing climate change decisions.

Keywords: Climate change, environmental degradation and data driven decision making

Socio- historical analysis on the nexus between environmental conservation and indigenous education among the Mau Ogiek of Kenya

Ronoh K. T., Kyule N. M. and Matheka M. R.
Egerton University
Corresponding Author: tronoh@egerton.ac.ke

ABSTRACT

This paper presents the nexus between environmental conservation and indigenous education among the Mau Ogiek of Kenya. Traditionally, the Ogiek as renowned hunter-gatherers have had distinctive histories of interaction with natural environment. Over the years, they have inhabited the Mau Forest with little impact on the environment that is symbiotically attributable to their robust and elaborate system of their indigenous education. The study employed an ethno-historical approach in its design, instrumentation, data collection, interpretation and analysis and it was guided by both the General Systems Theory and Cultural Ecology. The results reveal that the Ogiek connectedness to the environment transcends physical, social, intellectual, emotional and spiritual attachment as exemplified within the context of their indigenous education. The Ogiek indigenous education was largely informal while formal education took place in a more specialized contexts during initiation ceremonies and other attendant rituals, where youth were taken into seclusion period lasting for over six months. Formal education was also inculcated to the youth through apprenticeship schemes of hunting, herbal medicine, bee keeping, iron working and weaving. The core and centrality of Ogiek educational curriculum found its fulfilment on the nexus between environmental conservation and their precolonial system of education. In essence, the youths were inculcated skills and specialized techniques in diverse areas through apprenticeships. For instance, the Ogiek hunting practice and broader socio-cultural contexts incorporated a number of conventions and practices that sustain environmental conservation. The skills and techniques acquired thereon were perfected during initiation period. The curriculum, which was strictly adult-centred and distinctively gendered, entailed adopting members of the younger generation and children to their physical environment and teaching them how to sustainably utilize it. Environmental conservation was taught by parents, elders and cultural consultants to the youth through proverbs, myths, legends and folktales. In a nutshell, children learnt how to survive in a difficult forest environment by acquiring the tactics and techniques of escape when attacked by dangerous animals, poisonous snakes or fighting for safety from fierce bees. Therefore, the nexus between environmental conservation and indigenous education

remains critical component especially as Kenya and the globe struggle to address cross border challenges such as *inter alia*, climate change and food insecurity.

Keywords: Ogiek; African Indigenous Education, Environmental conservation, Youth

African indigenous knowledge perspectives on climate change adaptations

Karanja, A.

Department of Geography, Egerton University-Nakuru, Kenya. **Corresponding Author:** amon.karanja@egerton.ac.ke

ABSTRACT

Climate change is a threat to the pastoral livelihoods among marginal communities in Laikipia County. Frequent droughts results to food insecurity, scarce pasture, loss of livelihoods and human lives. Marginal communities in Laikipia are more vulnerable to drought because of overreliance on rain fed agriculture and natural pasture. Climate change is a major contributing factor to perennial conflicts in Laikipia due to resource scarcity. Climate changeadaptation remains the only viable option to increase agriculture production among marginal communities. Use of indigenous knowledge is an asset to the marginal communities most of whom lack formal education and access to modern technology. Primary data was collected using Key Informant Interviews and Focus Group Discussions. Purposive sampling was used to select respondents for the focus group discussion and key informant interviews. The data collected was analyzed using descriptive statistics namely frequencies, percentages and proportions. The study found that marginal communities rely on indigenous knowledge to predict drought occurrence, devise climate change adaptation strategies and conflict resolutions. The study findings are significant in mainstreaming indigenous knowledge in climate change adaptation strategies in Kenyans dry lands.

Keywords: Climate change adaptation, conflict resolution and drought, indigenous knowledge, marginal communities

Uptake of green energy practices: evidence from star-rated and nonstar rated hotels in Nakuru County, Kenya

Karemeri, M.

St. Paul's University Limuru, Kenya Corresponding Author: marywanjak2017@gmail.com

Hotel industry is a major part of development of tourism that spend a lot of its resources on energy intensive facilities. Uptake of energy efficient practices is relevant to hotels in saving approximately twenty percent of its operating costs. The aim of this study was to examine the uptake of green energy practices by hotels in Nakuru county. The study adopted a descriptive cross-sectional research design that involve both quantitative and qualitative methodologies in generating rich information to help fully explore the objective of the study. The target population of the study comprised 259 hotels registered within the categories of medium, large and very large, from which a sample of 204 hotels were selected using stratified random sampling method and 204 hotels were sampled and completed. Quantitative and qualitative data was obtained from respondents using a questionnaires and interviews. Quantitative data was analyzed using descriptive statistics and data was presented using tables and graphs. Qualitative data was analyzed using NVIVO software, and data was categorized into themes and presented in form of narratives. Findings show that hotels reported high uptake 90.2% of green energy practices policy, 83.3% retrofitted energy systems to enhance energy saving measures and 69.6% intentional procurement policy on purchasing energy saving electronics. However, the results of the study revealed low uptake 24.5% in creating awareness to employees on green energy policy, 16.7% budget for supporting green energy practices, and 26.0% in capacity building for hotel manager participation in any green energy environmental sustainability trainings. The hotel management should consider budgeting and trainings for staff on green energy practices to increase uptake levels and manage hotels energy consumption efficiently.

Keywords: Uptake, Green Energy Practices, Sustainable Energy Trainings, Sustainable Energy Policies, Sustainable Energy Budget

Site suitability analysis for an antivenom manufacturing laboratory using Geographic Information Systems

¹Liaka V., ¹Gwena M. O. and ²Milewa D.

¹Department of Geoinformation and Earth Observation,

The Technical University of Kenya

²The Dodoma University Tanzania, Department of Education Management and Policy

Studies (EMPS)

Corresponding Author: liakavision@gmail.com

ABSTRACT

Snakebite envenoming is a Neglected Tropical Disease that kills over 1000 people annually in Kenya, according to the World Health Organization. It disproportionately affects impoverished communities with limited healthcare access, particularly in remote areas where snake bites are common. The absence of immediate medical assistance is due to scarce and ineffective antivenom products in these areas. This gap underscores the need for establishing manufacturing laboratories for local production of antivenoms. This study analyzed site suitability for antivenom manufacturing laboratory in North Baringo constituency employing Geographical Information System (GIS) based multicriteria approach and Saaty's Analytical Hierarchy Process that incorporates physical, environmental, social, and economic factors. Factors such as slope, health facilities, roads, rivers, land cover, built-up areas, electricity grid, and protected areas were assessed based on their suitability, as determined by expert judgement from the National Museums of Kenya. Additionally, influencing weights, crucially determined by an expert with acceptable consistency ratios, guided the reclassification of various criteria into five suitability classes which are these classes. Our mapping findings revealed that 12.87% of the area is unsuitable, 47.26% is least suitable, 39.26% is moderately suitable, and 0.61% is highly suitable for an antivenom manufacturing laboratory. In conclusion, this study identifies suitable sites for antivenom manufacturing in Baringo North and further informs policies on healthcare planning for communities at risk of snakebites, emphasizing the importance of Geographic Information Systems for improving treatment of snakebite envenoming.

Keywords: Antivenom, snakebite, snakebite envenoming

Uptake of sustainable water management practices: Evidence from star and non-rated hotels in Nakuru County, Kenya

Karemeri, M.

St. Paul's University Limuru, Kenya Corresponding Author: marywanjak2017@gmail.com

ABSTRACT

Water is a scare resource and hotels use large quantities of water for their activities. The efficient water management practices in hotels is therefore essential to achieving its sustainability in the future. The aim of this study was to examine the uptake of sustainable water practices by hotels in Nakuru county. Nakuru is a tourism destination site due to natural features such as Lake Nakuru, Elementaita and Naivasha. The county continues to experience widespread environmental degradation due to economic activities with no exception of hospitality establishments. Hospitality industry are believed to contribute to the degradation of the environment due to high consumption of natural resources and waste production. The research adopted a descriptive cross-sectional research design that involve both quantitative and qualitative methodologies in generating rich information to help fully explore the objective of the study. The target population consisted of 259 hotels registered within the categories of medium, large and very large hotels, out of which a sample of 204 hotels were selected using the stratified random sampling method and 204 hotels were sampled and done. Purposive sampling was used to sample 13 government and private officials associated with the hotel industry who participated in the study. Quantitative and qualitative data was obtained from respondents using survey questionnaires and interviews respectively. Quantitative data was analyzed using descriptive statistics. Qualitative data was analyzed using NVivo software, and data was categorized into themes and presented in form of narratives. Findings show that hotels reported high uptake of 91.2% on policy on water conservation, 74.0% on rain water harvesting and storage water policies, 72.1% on rain water harvesting gutters and storage installed, and 72.5% on retrofitted water saving measures. However, the findings of the study revealed low uptake; 9.8% on budget for supporting sound water management practices, 26.0% on capacity building for staff on sound water management practices policy, and 8.3% on waste water recycling. The hotel management should consider budgeting and sensitization of staff on sustainable water management practices to increase uptake levels of sustainable water management practices.

Keywords: Sustainable water management practices, sustainable development, sustainable water management budget, sustainable water policies, uptake

LIST OF REVIEWERS

Sustainable and Safe Food Systems, Biotechnology and Climate-Smart Agriculture for Healthier Diets

- Prof. Paul Kimurto
- Prof. Joyce Lelei
- Prof. Nancy Mungai
- Dr. Miriam Charimbu,
- Dr. Stephen Indieka
- Dr. Joseph Mafura
- Dr. Mercy Wamalwa
- Dr. Perminus Migwi
- Dr. Maurice Oyoo
- Dr. Alex Kange
- Dr. Shem Kakai
- Dr. Raphael Gitau
- Dr. Stephen Githengu
- Dr. Benard Karanja
- Dr. Joel Khobodo

Trends in Science, Technology, Engineering and Mathematics

- Dr. Charles O. Muga
- Dr. Duke Oeba
- Dr. Elick Otachi
- Dr. Cox Tamba
- Dr. Walter Essendi

Environmental, Technical and Policy Approaches in the Context of Climate Change and Adaptation for a Resilient Society

- Dr. Oscar Donde
- Dr. Charles Kihia
- Dr. Amon Karanja
- Dr. Charles Kihia
- Dr. Hillary Chakava

Education for National Development in a Global Context; Literature, Language, Culture, Communication and the Creative Economy

- Dr. Grace C. W. Ndeke
- Dr. Simon Warui
- Dr. David K. Wamukuru
- Dr. William Orora
- Dr. Anne Barmao
- Dr. Miriam N. Kyule
- Mr. Daniel Getuno

One Health Approach, Health System Management, Health Financing, Pandemic Preparedness and Surveillance

- Dr. Ronald Obwoge
- Dr Dorothy Mituki
- Dr. Florence Thiakunu
- Dr. Kakai Khakame
- Dr. Dancan M. Wakoli

Literature, Language, Culture, Communication and the Creative Economy

Dr. Mary Chepchieng' Dr. Hillary Chakava

ORGANIZING COMMITTEE AT A GLANCE



Prof. Bernard O. AdudaDeputy Vice Chancellor (Academics, Research and Extension)



Prof. Nancy Mungai Director (Research)



Dr. Miriam Charimbu



Dr. Dorothy Mituki



Dr. Grace Ndeke



Dr. Mary Chepchieng



Dr. Nancy Matheri



Dr. Millicent Mokua



Ms. Susan Mbanda-Obura



Dr. Elick Otachi



Mr. Peter Gor



