



**3RD UNIVERSITY OF KABIANGA
MULTIDISCIPLINARY CONFERENCE
BOOK OF ABSTRACTS**

2023





UNIVERSITY OF KABIANGA
ISO 9001:2015 CERTIFIED
OFFICE OF THE CHAIRMAN OF COUNCIL

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MESSAGE FROM THE CHAIRMAN OF COUNCIL, DR. ADELAIDE M. MBITHI

It is with great pleasure that I welcome all participants to the 3rd research conference of University of Kabianga on the theme “ **Innovation and Practices for Research and Sustainable Development in the 21st Century**”. The sub-themes encompass critical areas of agriculture, food security, natural conservation, innovative approaches in business, education, health, STEM, and research commercialization. I wish to extend a very warm welcome to our invited guests led by **H.E. Ambassador Henriette Geiger**, EU, Head of Delegation in Kenya. Your presence in this conference is truly a testament of your commitment to education, research and sustainable development.

In today's rapidly evolving world, the role of research and innovation cannot be overstated. These are the driving forces behind progress, and their importance in achieving sustainable development goals cannot be underestimated. As the University Council, we are honored to host this event, which brings together brilliant minds and forward-thinking experts from various fields.

The sub-themes resonate deeply with the opportunities and challenges facing Kenya and across the globe. Agriculture and food security remain paramount, while the preservation of our natural resources is a collective responsibility. Innovative business approaches are shaping industries, and education is the cornerstone of progress. Health, STEM, and research commercialization are crucial for improving the quality of life for a country's citizens.

This conference provides a platform for researchers, scholars, policy makers, and industry leaders to share their insights, experiences, and solutions. It is our hope that the discussions and ideas generated here will not only inspire innovation but will also drive tangible actions towards sustainable development.

On behalf of the University of Kabianga Council and on my own behalf, I would like to extend our gratitude to the organizing committee, speakers, and all the participants for their dedication to this important endeavor. Together, let us explore innovative pathways to address the current contemporary pressing issues and propel our nation and the world towards a brighter and more sustainable future.

I wish you a fruitful and inspiring conference.

Dr. Adelaide Mbithi, PhD, HSC
CHAIRMAN, UNIVERSITY OF KABIANGA COUNCIL.

**SPEECH DELIVERED BY ACTING VICE CHANCELLOR PROF. MAURICE ODUOR ON THE OCCASION
OF THE 3RD UNIVERSITY OF KABIANGA INTERNATIONAL MULTIDISCIPLINARY CONFERENCE HELD
ON 27TH AND 28TH OF SEPTEMBER, 2023**

H.E. Ambassador Henriette Geiger, EU, Head of Delegation
Ambassador Samuel M. Gitonga, of the Ministry of Foreign Affairs
H.E. Dr. Erick Mutai, Governor of Kericho County
H.E. Prof. Hillary Barchok, Governor of Bomet County
Prof. Richard Mibey, former VC Moi University

All participants and exhibitors,
Distinguished Guests,
Ladies and Gentlemen

Good morning,

On my own behalf, University Council, Management Board, staff and students, I am delighted to welcome you all to University of Kabianga.

University of Kabianga situated in Kericho County prides to be in the tea lash area; with several factories to process the produce. The institution also is to the South West of Mau Forest. In earnest endeavor to save the forest cover, the university has an annual cross – country athletics event in which time, tree planting on identified spots is done. We have continued this exercise since 2009 when the University was gazetted as a Constituent College of Moi University. With a target of one thousand five hundred tree seedlings each year, we have been able to increase forest cover for sustainable development with eighteen thousand tree seedlings planted to - date.

As guided by its mission: "To create, preserve and transfer knowledge and technology through quality and entrepreneurial education, research, extension and partnership with government, industry and non-state actors whilst ensuring a sustainable environment" the University has championed itself in various research and activities. I am happy to mention that our lecturers have come up with various innovations.

As the institution aspires: "To be a leading University in scientific innovation for the betterment of humanity", has developed; among others, an innovation duped Mama Care. This application alerts the breast-feeding mother on times set to do it. It is in use now by the County Referral Hospital.

Ladies and Gentlemen, when Kenya National Innovation Agency (KeNIA) in collaboration with African Centre of Technology Studies (ACTS) and the ATP program initiated and advertised Expression of Interest (Eoi) for Institutional Commercialization Support Phase II, University of Kabianga and four other institutions; namely Jaramongi Oginga Odinga University of Science and Technology, Moi University, Kenya Agricultural and Livestock Research Organization and Kenya Industrial Research and Development Institute were selected competitively to implement the program beginning end of 2022.

The program aimed at developing, validating and implementing Institutional Commercialization Innovation Master Plans (2022-2025) and in view of the same, University of Kabianga was able to develop and validate a commercialization master plan to guide on all aspects of innovations and converting innovative ideas to commercializable products.

University of Kabianga was among other institutions who attended the Institutional Support Phase II close out workshop in Lake Naivasha Resort on 10th to 11th July, 2023 organized by KeNIA, ACTS and UKAid (FCDO). The workshop was a culmination of efforts by the Institutional Support Phase II work on strengthening technology transfer and commercialization. We were able to present University of Kabianga Commercialization Innovation Master Plan (2022 – 2025) which aims at strengthening the capacity to convert research outputs to innovative projects with high commercialization impact and outlines different pathways to achieve specific outcomes. Consequently, the University Management Board has began implementation of the master plan by setting up a Technology Transfer Office under the Division of Research, Linkages and Extension which will streamline all aspects of innovation ideation, incubation, Intellectual Property Rights, and commercialization of projects.

In a spirited effort not leave behind the students, we incepted what we call: Technophiles Research and Innovation Club Students (Teric) Innovation Seminar (TeRIC) which is a student based innovation think tank drawn from the three programs at the School of Health Sciences to discuss the need for embracing research and innovation in the fields of medicine, agriculture and others.

Innovation and commercialization of research products is a critical factor in addressing the complex challenges faced in the medical, agricultural and other sectors of the economy. The rapidly evolving nature of these fields demands constant exploration of new ideas, technologies, and practices to address issues ranging from climate change, disease outbreaks, and food insecurity, among others. Commercialization of innovations is a viable path towards mitigating the financial crunch that Universities face.

Commercialization is a critical aspect of research and innovation as it allows for the practical application of research findings, thus contributing to economic growth, job creation, and societal development. The University of Kabianga recognizes the importance of commercialization and is committed to supporting researchers and students in this process.

Guest Speaker, University of Kabianga Commercialization Master Plan (2022-2027) is anchored on one of the major strategic pillars of the University, namely: research, innovation and extension pillar. It is an ambitious roadmap that complements other University activities and plans, specifically designed to strengthen the University's research output and at the same time generate wealth through the commercialization of research products. The CMP seeks to play a critical role in ensuring that it transforms into a self-sustaining institution against the backdrop of financial limitations and diminishing exchequer grants. It also seeks to anchor research away from the general perception and practice those measures publications as the desirable end product. The Commercialization Master Plan, therefore, addresses key concerns that can accelerate the commercialization process. The master plan covers the situational analysis of University of Kabianga on Commercialization, the strategic direction of the plan, key strategic Issues and objectives.

Ladies and Gentlemen, the foregoing information I have laid set pace on the theme of this conference: *"INNOVATION AND PRACTICES FOR RESEARCH AND SUSTAINABLE DEVELOPMENT IN THE 21ST CENTURY"*. We are the people, we are the innovators to lead in various innovations that will make life better in this century. I note with gratitude various exhibitions before us in this auspicious event. Whatever it will take, let us push on the baton of innovation and research; with the challenge that who else would do it if not you and I. It is absolutely us and thanks that you are in and participating in this conference.

Ladies and Gentlemen, the University in quest to bolster innovation and research, has aligned in its Strategic Plan priorities and plans to national and global societal concerns to improve livelihoods and economic empowerment based on knowledge creation and sharing, innovations, emerging technologies and national development goals, reforms in the education sector, financial limitations in the country and strengthening university capacity to execute its mandate and enhance its niche globally; which is : *"To enhance natural resource, sustainable land use and entrepreneurship."*

Guest Speaker, Ladies and Gentlemen, as a fellow researcher, I am convinced that deliberations and presentations of this conference will find place in a Referred Journal for reference by other researchers.

Once again, you are most welcome to University of Kabianga. I wish you good time and fruitful presentations.

Thank you.

PROF. MAURICE ODUOR
ACTING VICE-CHANCELLOR
UNIVERSITY OF KABIANGA



UNIVERSITY OF KABIANGA

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OFFICE OF THE DEPUTY VICE CHANCELLOR ACADEMICS AND STUDENT AFFAIRS

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MESSAGE FROM Ag. DEPUTY VICE CHANCELLOR ACADEMIC AND STUDENT AFFAIRS PROF. PAUL ONCHERA ONSARE

All invited guests,

Ladies and gentlemen

Research is a key component in advancing the role of Science, Technology and Innovation. There are diverse research areas that are critical for economic development and this conference will address some of them through the identified sub-themes

The Academic Division recognizes that Research and Development (R&D) is critical to achieving the desired socio-economic transformation through fostering high quality research in the university. This is the third University of Kabianga Multidisciplinary conference with the theme: Innovation and Practices for Research and Sustainable Development Goals in the 21st Century. 2023

University of Kabianga's second Annual International Conference held at Sunshine hotel in Kericho. The theme was *"Ethical Sustainable Development for the Betterment of Humanity"* 2018 University of Kabianga's 1st Annual International Conference **"Encouraging Interdisciplinary Research and Innovation for the Betterment of Humanity". 2016**

We are lucky to be in such a beautiful location; Kericho County which is home to the best of Kenyan Tea and renowned worldwide for its taste. I hope that is not the main reason you are here!

In today's fast changing world, attending a conference has become a "must" to survive in an academic discipline. Many academicians have become aware of this fact as the number of conferences and participants increase dramatically. We look forward to building synergies and collaborations.

Climate change: its impact is so diverse that it could range from a simple family dispute all the way to an international armed conflict. This implies that we need to use what we have (just like the traffic rules) while being mindful of others, now and beyond. This is the key driver of our conference theme: "Innovation and Practices for Research and Sustainable Development Goals in the 21st Century". The outcomes of this conference will therefore have no meaning unless they reach the end users or put to practical use (extension services).

Allow me also to appreciate our keynote speaker, H. E. Amb. Henriette Geiger, and; Amb. Samuel M. Gitonga.

May I also thank the Division of Planning, Research & development and the conference organizing committee for having worked hard to ensure we have our third Multidisciplinary Conference.

THANK YOU



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OFFICE OF THE DEPUTY VICE CHANCELLOR PLANNING RESEARCH AND DEVELOPMENT

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MESSAGE FROM DEPUTY VICE CHANCELLOR PLANNING RESEARCH AND DEVELOPMENT
PROF. MAURICE ODUOR

It is my pleasure to welcome all participants to the 3rd UoK International Conference. The university of Kabianga through the Division of Planning, Research and Development appreciates and recognizes that research is a key pillar in every institution of higher learning and to this end, dissemination of research results is necessary for the academic growth and development of such institutions. This conference provides a perfect platform for researchers to disseminate their results.

In tandem with the 21st century skills involving Communication, Collaboration, Creativity and Critical Thinking, the theme; 'Innovation and Practices for Research and Sustainable Development in the 21st century provides a rare opportunity for researchers to showcase the relevance of their research undertakings.

We commend the University Council for allocating resources which made it possible to organize this conference. We salute the main speakers who have travelled from far and wide to join us and share their experiences on the main thematic area. We appreciate the presenters who submitted their Abstracts and created time to develop quality conference papers. Without you, there would be no conference. To the organizing committee, led by Prof. Joash Kibet, your performance was exemplary. Through your tireless efforts, the conference attracted over 100 Abstracts. To the reviewers of the Conference Abstracts, you gave it the best shot. To our sponsors, we sincerely thank you. It is through your generous contribution of resources that this conference is happening today. Forever, we shall remain grateful.

I wish you a successful stay in the great green County of Kericho.

Welcome!



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OFFICE OF THE DEPUTY VICE CHANCELLOR ADMINISTRATION AND FINANCE

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**REMARKS MADE BY THE AG.DVC-ADMINISTRATION & FINANCE, PROF. ISAAC NAIBEI DURING
THE 3RD UOK INTERNATIONAL MULTIDISCIPLINARY CONFERENCE HELD ON 27TH & 28TH SEPTEMBER,
2023**

All Invited Guests

Ladies and gentlemen, Good morning

On behalf of the Division of Administration and Finance, I am pleased to make a few opening remarks for this 3rd University of Kabianga Conference. I wish to welcome and congratulate all participants and organizers to the third University of Kabianga International Multidisciplinary Conference with the Theme: Innovation and Practices for Research and Sustainable Development Goals in the 21st Century.

The University recognizes the need of research and extension being its core mandate. Council has allocated funds to a tune of Ksh 9,500,000 in the FY 2023/2024 budget to ensure that research is encouraged and the results from such conferences are disseminated. As a way of encouraging research, the University through the division continues to recognize and reward the most outstanding Researcher of the year.

The University prides itself as one of the premier varsity fronting innovation and excellence research as carried in the current theme of the conference which will go a long way in providing new solutions to societies in betterment of humanity. The Conference being a multidisciplinary will provide a platform for all scholars and experts in different fields to make a contribution through dissemination of innovative studies for sustainable development. The world is ever evolving and to remain afloat in the 21st century, innovation must be emphasized.

It is important to note that the role of innovation in sustainable development is finding new and more efficient ways of using resources, reducing waste and pollution, and creating sustainable products and services which in turn help in addressing the three fundamental pillars: Social, Economic and Environmental challenges facing the world in the 21st Century. The sub themes of this conference will provide solutions for challenges facing the world today.

As I conclude, I would like to wish you all a fruitful participation and I am certain that this conference will be a memorable one. THANK YOU



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OFFICE OF THE DEPUTY VICE CHANCELLOR PLANNING, RESEARCH AND DEVELOPMENT

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MESSAGE FROM DIRECTOR OF RESEARCH, LINKAGES AND EXTENSION PROF. ISSA MWAMZANDI

It is with great pleasure that I welcome all esteemed guests and participants of the 3rd University of Kabianga Conference. The Directorate of Research, Linkages and Extension wishes to congratulate you for finding time to join us and engage in critical topics in innovation that truly address the concerns of humanity.

University of Kabianga is passionate about innovation and firmly believes that the six sub-themes are critical in the way we will re-engineer service delivery in all sectors of our economy. They are key in championing, among others, the bottom-up agenda that the Government of Kenya holds dearly.

The themes carefully imbue a conversation that seeks to offer solutions to the many challenges that continue to emerge in our society.

The abstracts that form the core of the presentations have been carefully sifted and synthesized by a great team of professionals. The abstracts have been drawn from various disciplines by researchers of great repute and are products of well thought out research processes. They inject new horizons of innovation. The abstracts are well crafted and address key areas of concern ranging from innovations in agriculture and food security, health and sanitation, education, climate change and mitigation measures, among other areas.

Most importantly, there are presentations that address the commercialization of research products. This is an emerging area that will certainly generate wealth not only to the individual researchers, but also ensure the wellbeing of humanity.

University of Kabianga welcomes all of you and we hope to see these seminal presentations transform into viable ventures in the near future.

Thank you

Prof. Issa Mwamzandi

Director Research, Linkages & Extension



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OFFICE OF THE CHAIR, CONFERENCE ORGANIZING COMMITTEE

.....
MESSAGE FROM THE CHAIR OF THE ORGANIZING COMMITTEE, PROF. JOASH K. KIBETT

Dear Esteemed Colleagues and Distinguished Guests,

It is with great pleasure that I extend my warmest greetings to all of you as you gather for the 3rd University of Kabianga Multidisciplinary Conference on 'Innovation and Practices for Research and Sustainable Development in the 21st Century.' This year's conference, which is the 3rd to be held by the University, and the first to be held at the main campus, promises to be an exceptional platform for exchange of knowledge and ideas, revolving around our sub-themes of agriculture, food security, natural resource conservation, innovative approaches in business, healthcare, STEM, commercialization of research, and education.

We are thrilled to announce that we have received an overwhelming response, with over 100 high-quality abstract submissions from researchers and scholars around the globe. This remarkable engagement is a testament to the significance of our chosen sub-themes in addressing the challenges and opportunities of our time.

I am delighted to share that our conference will be graced by the presence of distinguished guests, including Ambassador Henriette Geiger, Head of the EU Delegation in Kenya and H.E. Dr. Erick Mutai the Governor of Kericho County, H.E. Prof. Hillary Barchok the Governor of Bomet County as well as Ambassador Samuel M. Gitonga. Their participation underscores the importance of our endeavours and brings valuable perspectives to our discussions.

I would like to express our heartfelt gratitude to all our sponsors for their generous financial support, which has made this event possible. Your commitment to the advancement of research and sustainable development is deeply appreciated.

Additionally, I would like to extend our sincere thanks to the University Management for their unwavering support towards the organization of this conference. Their encouragement and resources have been invaluable in ensuring its success.

Last but not the least, I want to acknowledge and applaud the dedicated efforts of the members of the Organizing Committee as well as the members of the secretariat. Your tireless work and passion have been instrumental in shaping this conference into a prestigious and intellectually stimulating event.

As we embark on this journey of knowledge sharing, collaboration, and exploration, let us remember that it is through innovation and collective practices that we can pave the way for more sustainable and prosperous 21st century.

I look forward to the insightful discussions, networking opportunities, and collaborative partnerships that will undoubtedly emerge from this conference. Together, we can inspire change, foster progress, and contribute to a brighter future.

Thank you, and let the 3rd Multidisciplinary Research Conference begin!

THE 3RD UNIVERSITY OF KABIANGA INTERNATIONAL MULTIDISCIPLINARY CONFERENCE

THEME: INNOVATION AND PRACTICES FOR RESEARCH AND SUSTAINABLE DEVELOPMENT IN THE 21ST CENTURY

26th September, 2023

TIME	VENUE	EVENT	RESPONSIBILITY
2.00 pm	Kericho Town	Arrival of Amb. Samuel M. Gitonga	Protocol Committee

27th SEPTEMBER, 2023

Master of Ceremony: **Dr. P, Chumba**

TIME	VENUE	EVENT	RESPONSIBILITY	RAPPORTEUR
7:30 am 8:15 am		Registration	Secretariat	
8:15am 10:30 am	Main Hall	Opening Prayers • Introductions • Opening ceremony • Remarks by: i) Director, RL&E ii) DVC, A&F iii) DVC, A&SA iv) DVC, PR&D v) Vice Chancellor • Remarks by: i) H.E.Eng. Fred Kirui, Deputy Governor, Kericho County. ii) H.E. Prof. H. Barchok, Governor, Bomet County. • Address and official opening by main Speaker: Amb. Samuel M. Gitonga	Master of Ceremony/ University Chaplain Master of Ceremony/Prof. J. Kibett	Rapporteur: Dr. J. Hitimana
11:00 am 11:15 am	Main Hall	Plenary session	Chair: Chair: Dr. E. Mibei	Rapporteur: Dr. J. Kiplimo
11:15 am 11:35 am	Health Break /Photo session		Hospitality Team	
11:35 am 1:45pm	Main Hall	Sub-theme I presentations	Moderator: Dr. M. Yegon	Rapporteur: Dr. T. Matonyei
		Beatrice Chepkorir, Linah Muhonja, Noel Makete, Kelvin Moseti and Purity Gacheri: Effects of Colchicine Treatment on Leaf Surface Area of Selected Mulberry Accessions		
		Carolyn Cherotich and Manmeet Kaur: Comparative Analysis of Risk Perception and Risk Management Strategies among Vegetable Growers in Punjab State, India and Nakuru County, Kenya		
		Noah Kibet: Poverty in the Face of Global-Gap Standards: The Case of Smallholder French Beans Farmers in Kirinyaga County, Kenya		
		Jane Khasoa Lusenaka: The Mediating Effect of Institutional Support on Agribusiness Incubation and Livelihood Security in Bungoma County		

		Samwel Kipchumba Koskey: Econometric Analysis of Factors Affecting Milk Production: A Case of Uasin-Gishu County, Kenya	
		Shaleti Abdalla: Innovative Artificial Fish Incubation and Sex Reversal Technology: Enhancing Fish Production, Sustainability, and Hormone-Free Aquaculture.	
Room I/Senate Chamber	Sub-theme: II Presentations	Moderator: Dr. H.W. Sang	Rapporteur: Dr. P. Chepkwony
	William Bett Kiprotich, Hilary Ndambiri, Jared Mose, Alfred Serem Evaluating preference variation in discrete choice experiments using farmers' choice decisions for sweet potato varietal traits in Kenya		
	Jane Gitahi, Gichuki Kingori, Isaac Naibei: Intellectual Capital as the Key to Sustainable Innovation: A Systematic Literature Review		
	David Chepkwony, Lydia Langat, Patricia Chepkwony, Reuben Langat Objective Quality and Price Variation in Tea Marketing: A Case of Kenya Tea Development Agency Factories in West and East of Rift Valley, Kenya.		
	Sharon Cherotich, Williter Chepkemai Rop, Alfred Bett: Relationship Between Seminars and Employee Performance in Level Four Hospitals In South-Rift Region, Kenya		
	Prof. Richard Mibey: Commercialization of University Research in Africa for Addressing Food Security and Solid Waste Management Challenges.		
	Shadrack Mule, Issa Mwamzandi and Patricia Chepkwony: Transforming Research Knowledge to Commercialization Economy at The University Of Kabianga		
Room II	Sub-theme III Presentations	Moderator: Dr. Thomas OtienoJuma	Rapporteur: Dr. V. Ngeno
	Thomas Otieno Juma,: Small State Resilience in Global Power and the Influence of Foreign Policy		
	Agnes Muthoni Njuguna: Unveiling the Functions of Linguistic Registers in Advertisements by Traditional Healers in Public Urban Spaces: A Hallidayan Register Theory Perspective		
	Gilbert Kimutai : Kenya's Peace Diplomacy in Eastern Africa: Regional Hegemon?		
	Odhiambo Alphonse Kasera, Barack Calvin Omondi, Phanice Wangila, Michael Omondi Owiso.: Beyond Elitist Feminism: An Intersectional Analysis of the nature of Political Participation during Campaigns in rural poor areas of Kenya		
	Abu Ahmed Adamu, Goudian Gwandeba PhD, Ronald Bituka: Sustainable Educational Development through Access to Information: A Kenya Perspective.		
	Janet C. Kimeto, Kezia H. Mkwizu: Agro-Tourism and Education: Perspectives from Kenya and Tanzania		
	Paul Onsare Onchera: Policy, Dilemma and Practices In Kenya's Bilingual Education Programmes		
Room III	Sub-theme IV Presentations	Moderator: Prof. E. Nyangena	Rapporteur: Mr. A. Koskey
	Dr. Diana Mutuku Munyao. The Role of Popular Songs in Climate Change Awareness and Adaptation in Kamba Community of Kenya.		

		Shaleti Abdalla, Lydia Awuor, Meshack Chesere: Wireless Stethoscope for Enhanced Cardiac Auscultation Training and Diagnosis		
		Joel Ngetich, Alfred Akwala: Mental Health among the rural poor Communities in Kenya An Investigation of Two Primary Facilities in South Rift		
		Chepngeno Judy B. A*, Anyonje Lydiab : Interpersonal communication barriers to the uptake of cervical cancer screening in Uasin Gishu, Kenya (5).		
		Gilbert Nyakundi Okebiro: Community Involvement Approaches to Covid-19 Infection, Prevention and Control in Lodwar Town, Turkana County, Kenya		
Room IV	Sub-theme V Presentations	Moderator: Dr. R. Langat	Rapporteur: Dr. L. Otanga	
	Wilfred Khafulu, Levi Otanga, Wesley Kirui : Mathematical Model of Solid Waste Management In Nyamira Municipality Using Fuzzy Goal Programming			
	Andrew Odhiambo: Solar Energy-Driven Water Disinfection with Photocatalytic and Photothermal Science			
	Kotut,J.S, Yugi, J.O, J.J,kiplimo: Efficacy of Senna didymobotrya and Thunbergia alata Plant Extracts against Selected Bacterial Clinical Isolates from Kericho Referral Hospital			
	G. K. Arusei,*, M. Chepkoech *, G. O. Amolo and N. W. Makau: The structural, Electronic and Optical Properties for Selected 211 MAX Phases: A Density Functional Theory Study			
	Ronald Rop, Ben Otange, Julius Oyugi, Zephania Birech: Qualitative and quantitative analysis of HIV-1 in human blood and plasma using Raman Spectroscopy with Chemometric Analysis			
1:45pm	Lunch Break and Exhibitions		Hospitality Team & Exhibitors	
2:30 pm		Sponsor Presentations		
2.30 pm				
2.40 pm				
2:30 pm	Main Hall	Address by Prof. Richard Mibei	Chair: Dr. R. Rop	Rapporteur: Dr. L. Ochola
3:30 pm	Main Hall	Plenary Session/ Announcements	Chair: Dr. G. Kere	Rapporteur: Dr. R. Wesonga
3:30 pm				
3:45 pm				
3:45 pm	Main Hall	Sub-theme I Presentations	Moderator: Dr. M. Yegon	Rapporteur: Dr. T. Matonyei
5.00 pm		Conrad Khisa Wanyama, Fred Wekesa Masinde, John Wanjala Makokha, George Wangila Butiki: Determination of Radon-222 Concentration Levels In Underground Water In Bungoma South Sub-County, Kenya		
	John Napoo¹, Pharis Ndwiga², Victor Musitia³: Decrypting the Effect of COVID-19 Pandemic on Food and Nutrition Security in Kenya			
	Romano Okwi Elingit: Role of agroforestry in environmental conservation and food security in Kenya			
	Susan A Otieno, Coombs Joe, Paul Collins, and David Douches: A composite approach to enhance blackleg and the tuber soft rot resistance in potato through A. tumefaciens mediated expression of AHL lactonase gene and introgression of Quantitative resistance from Solanum brevidans			
	Mohdar N.H, M., Oscar Kisaka and Matonyei Thomas,: Determinants of			

	agroforestry adoption and associated benefits among smallholder farmers of coastal Kenya		
Room I/Senate Chamber	Sub-theme: II Presentations	Moderator: Dr. H.W. Sang	Rapporteur: Dr. P. Chepkwony
	Meshack Katam : Influence of Covid-19 Crisis on Human Resource Management Practices and Policies: An Empirical Study of Theories		
	Nicholas Kipkorir Mutai¹, Pauline Keitany² and Patricia Chepkwony³ : E- Sourcing Strategies on Procurement Performance of Tea Factories Managed By KTDA In South Rift Region		
	Dr. Lucy Jumah¹ : Relationship between Job Characteristics and Employee Commitment in Star Rated Hotels in Kisumu City, Kenya		
	Kennedy O. Ogwengo, Dr. Geoffrey Kamau, Dr. Njenga Gitahi : Influence of Environmental Dynamism on Implementation of Universal Health Coverage In Kenya		
	Jack E. O. Ogembo, Jaqueline Kandagor : The Portrait of Animals as Humans and Humans as Animals or Objects in Some Selected Western Kenyan Musical Tracks as a Basis for Technological Development Culture and Technology		
Room II	Sub-theme III Presentations	Moderator: Dr. Thomas Otieno Juma	Rapporteur: Dr. V. Ngeno
	Philip Chebunet : Communication Strategies Employed By The Radio Talk Show Presenters Influencing Oral Presentation Expertise Among University Students In Eldoret Town		
	Robert Okari Maosa : Kenya's Human Rights Law and Artificial Intelligence: The Dilemma.		
	Simiyu Kisurulia : Literary artists and African witchcraft: The unending search for solutions		
	Ongek Margaret*, Ogott Georgel : Implementation Issues in Competency-based Curriculum Towards Sustainable Development in Kenyan Schools.		
Room III	Sub-theme IV Presentations	Moderator: Prof. E. Nyangena	Rapporteur: Mr. A. Koskey
	Roy Nashombe : Power Distance and Safe-Sex Messaging: Assessing the Effectiveness of Condom Advertisements among University Students in Kenya.		
	Indiana Chebet, Tom Obote, Paul Njoroge : Revolutionary Mosquito Zapper: A Novel Approach for Efficient Mosquito Control and Disease Prevention.		
	Odanga, Sylvester J Otieno, Otieno, Roy D. Onyango & Juma, Dorothy : Status of Mental Health Policy Implementation in Kisumu, Kakamega, Vihiga and Bungoma Counties, Kenya		
	Elizabeth Mala, Wilys Mukuna, Maurice Oduor : Mathematical Model for the Effects of Physical Activity and Nutrition Rates In Patients With Diabetes Mellitus		
Room IV	Sub-theme V Presentations	Moderator: Dr. R. Langat	Rapporteur: Dr. Otanga
	Mr. Godfrey Keter, Levi Otanga², Lao Hussein³ : Generation of Cyclic Codes Over Galois Field (29)		

		Byrum Ronoh, Levi Otanga: Prey-Predator Model on The Interaction of Pathogenic Bacteria and Bacteriophages In Presence Of Medication		
		Joseph Kipyegon Cheruiyot: Special cubic Simplex lattice design in Estimation of Fertilizer Component Proportions for Optimal Production of Maize yield		
		Too, C.L, Yugi , J.O, J.J,kiplimo: Extraction and Profiling of phytochemicals present in Selected Ornamental Plants in Kericho County		
	Room V	Sub-theme VI Virtual	Moderator: Dr. S. Mule	Moderator: Dr. F. Onyangore
5.00 pm 5.30 pm	Health break and Exhibitions	Hospitality Team & Exhibitors		
6:00 pm 8:00 pm	Kericho Town	Vice Chancellor's Dinner	Dr. C. Sang	

DAY TWO
28TH SEPTEMBER, 2023

Master of Ceremony: **Dr. Rev. E. Too**

TIME	VENUE	EVENT	RESPONSIBILITY	RAPPORTEUR
7:30 am 8:15 am		Registration	Secretariat	
8:15 am 8:30 am	Main Hall	Recap by the Chairman.	Master of Ceremony	
8:30 am 10.45 am	Main Hall	Sub-theme I Presentations	Moderator: Dr. M. Yegon	Rapporteur: Dr. T. Matonyei
		Joseph Kipkorir Cheruiyot¹, Joash K. Kibett²: Evaluation of Social capital attributes as predictors of Collective actions among Smallholder farmers in Tinderet Sub county, Kenya		
		Nelly Sang¹, J. Kibett², M. Otiende³ : Relationship Between Selected Factors and Performance of Out-Of-School Agricultural Youth Groups: A Case of Kipkelion East and Kipkelion West Sub-Counties, Kericho County.		
		Romano Okwi Elingit: Role of government agencies and their challenges in sustainable food security in Kenya		
		Mitchel Oluoch¹, Stephen Omondi², Joram Mbinga³: Role of tree breeding and improvement in commercial forestry amidst climate change adaptation in Kenya.		
		Ndaku J. Nkonge¹, Sietinei Ann², Ngetich K. Job³: Sustainable Use Of Water Resources By Non-Resident Students In Public Universities In Kenya: The Case Of The University Of Kabianga		
		Susan A Otieno, Coombs Joe , Paul Collins, and David Douches: A review of the significance of 2n gametes in potato breeding and production options of adopted cultivars		
		George Otieno, Joseph Hitimana, Felix Oriwo: Mainstreaming Kitchen Gardening in The Urban Housing Approval Process: A Review Of East African Countries		
		M. W. Mbiyu, M. W. Nyongesa, W. M. Muiru, J. W. Kimenju, and S. Haukeland: Diversity Of Potato Cyst Nematode Populations In Nyandarua, Meru And Nakuru Counties Based On Internal Transcribed Spacer Region (Its) And Simple Sequence Repeat Markers		
		Joel Kimutai Soi: The Role of Universities in Natural Resource Conservation and Sustainable Development		
	Room I/Senate Chamber	Sub-theme: II Presentations	Moderator: Dr. H.W. Sang	Rapporteur: Dr. P. Chepkwony
		Teclah Tuwei¹, Raymond Kemboi¹, Isaac Naibei¹, Johnmark Obura¹: Covid-19, Risk		

		Management and sustainable development: An Empirical Review of Theories		
		Ruth Ogega, Romano Okwi Elingit: Intrapreneurship: Identification, Nurturing, And Retention On Organizational Performance And Sustainability: A Case Of SMEs In Kenya		
		Lyndah J. Rono, Williter Chepkemoi Rop, Patricia Chepkwony: Loan Lending Mechanisms and Growth of Women Enterprises Funded by Kenya Women Finance Trust in Kericho County		
		Soi Hazel Chebet : Risk taking, Innovativeness and Family Owned Firm Performance. The Mediating Role of Family Firm Governance.		
		Prof. Joshua Gichaba Manduku : Commercialization of Innovative Research: a case study of Kenyan universities.		
	Room II	Sub-theme III Presentations	Moderator: Dr. Thomas OtienoJuma	Rapporteur: Dr. V. Ngeno
		Chepngeno Judy B, Anyonje Lydia : Interpersonal communication barriers to the uptake of cervical cancer screening in Uasin Gishu, Kenya (5).		
		Odhiambo Alphonse Kasera, Thomas Otieno Juma¹, and Philip Oloo² : Civil Society Organizations in Pre-Elections Peace-Building in Conflict Hotspot Zones: A Study of Kisumu County in the lead-up to Kenya's 2022 Elections		
		Thomas Otieno Juma, and Alfred Kipyegon Bett, : Power Disparities: "Employee – Employer – Trade Union" Relational Matrix for Organizational Motivated Service Force Development		
		Pontian G. Okoth,: Cultural Diplomacy and Economic Interests Between Kenya And Uganda		
		Janet Surum: Gender differences in the Academic Resilience of Public Secondary School students in Turkana County, Kenya		
		Dorothy C Soi.¹,Janet Surum ²: Role of secondary school administrators' mental health literacy in implementation of mental health program in sub-county secondary schools in Ainamoi sub-county, Kericho.		
	Room III	Sub-theme IV Presentations	Moderator: Prof. E. Nyangena	Rapporteur: Mr. A. Koskey
		Faith Onyangore, Erick Mibei 1 Isinta M Elijah² , Job Isaboke³ : Relating Urinary Trace Elements Influencing Child and Maternal Health Status and Socio Demographic Characteristics in Western Kenya.		
		Lydia Awuor, Shaleti Abdalla, Tom Obote: Integrated Bee Hive for Enhanced Bee Venom Collection: Revolutionizing Apiculture for Pharmaceutical Advancements And Entrepreneurial Opportunities.		
		Yugi, J.O.* and Khatoro R. T.: Insecticidal efficacy of methanol and Hexane Crude extracts of <i>Urtica massaica</i> Mildbr (family: <i>Urticaceae</i>) plant part extracts against immature stages of <i>Anopheles gambiae</i> Giles (Diptera: <i>Culicidae</i>) mosquitoes		
		Edith Jelagat Biwoth, Joel Ngetich: Kenyan Government Communication In The Sudan Crisis: An Analysis Of @Forenoffice Ke Twitter Page		
	Room IV	Sub-theme V	Moderator: Dr. R.	Rapporteur: Dr.

		Presentations	Langat	Otanga
		Levi Otanga Olwamba: On Monotone Properties Of $\llbracket \mu_{-}(f \wedge p) \rrbracket^{((i-1,i))}$ -Measurable Sets		
		Wandugu Joseph Ogidi, Kirui Wesley, Adicka Daniel : Global Stability of Cancer Endemic Equilibrium Point Using Mathematical Modeling Approach In The Presence Of Chemotherapy		
		Chepngetich Betty, Fred W. Masinde, Enoch K. Rotich : Natural Radioactivity Levels in Rocks Excavated From Kericho County Quarries, Kenya		
		Beatrice M. Gathongo: Extreme Values and Reliability Measures of Continuous Erlang Mixtures		
		Pela Cherono, Kirui Wesley, Adicka Daniel : Bifurcation and Stability Analysis of HIV-1 Coronavirus Co-Infection Model.		
	Room V	Sub-theme VI Virtual	Moderator: Dr. S. Mule	Moderator: Dr. F. Onyangore
		Damaris Wanjiku Waiharo : Financial Literacy and Retirement Planning Behavior In The Kenyan Informal Sector		
		James Tindi Onyango, N.K. Kumaresan Raja, Thomas Otieno Juma: Enhancing Sustainable Development Through Non-Traditional Security Approaches: A Comprehensive Review of the Implementation and Efficacy of Community Policing in Kenya		
		John Oloo Gwendo, Faith Kibas: Cognitive Assessment of ChatGPT – a Generative Large Language Model and Undergraduate Students: A Comparative Study in Structured Programming using the Revised Bloom's Taxonomy		
		Paul Njoroge, Meshack Chesere, Lydia Awuor: Smart Dustbin Innovation: Advancing Infection Prevention through Automated Lid Operation and Waste Sterilization.		
		Abiuty O. Omweri, Matthew Loftas, Pamela Kimeto Ting'ei: Post-Discharge Experiences Among Caregivers of Preterm Babies In Kericho County, Kenya.		
		Lusegah Juddith¹, M., Oscar Kisaka² and Matonyei Thomas³: Factors Determining Access to Credit by Private Forest Farmers in Kiambu County, Kenya		
		Hezekiah Otieno Omolo, Berther Kute, Rodah Adoyo: Contribution of Teacher Practices in the Provision of Student Safety in Emergency Incidents in Public Secondary Schools: A Case Study of Kisumu County		
		Biegon Kipkoech Collins, Alex Kibet, Andrew Mwaura Kahonge: Preserving Privacy: How Governments and Digital Services Can Harness Zero-Knowledge Proofs for Secure Identification		
		Ang'aba Aden Esokomi¹, Naini Pauline Kararei² & Thomas Otieno Juma³: Realigning Political Leadership to the Advancement of Road Infrastructure for Sustainable Development in Narok North Sub-County, Kenya		
11.30 am 11.45 am	Health Break/ Exhibitions		Hospitality Team & Exhibitors	
11.45 am 12.05 am		Remarks by: i) Vice Chancellor ii) Chair of Council, Dr. A. Mbithi	DVC PR&D	Dr. J. Hitimana

12.05 am 12.15 pm		Remarks by: H.E Dr. E. Mutai Governor, Kericho County,		
12.15 pm 12.45 pm		Address by key note Speaker H.E. Amb. Henriette Geiger , Head of EU Delegation in Kenya		
12.45 pm 12.55 am	Main Hall	Plenary session	Prof. J. Kibett	Dr. C. Kagucia
12.55 pm 1.05 pm	Photo Session		Dr. P. Chepkwony/ PRO	
1:00 pm 2:00 pm	Lunch/Exhibitions		Hospitality Team & Exhibitors	
	Main Hall	Sub-theme I Presentations	Moderator: Dr. M. Yegon	Rapporteur: Dr. T. Matonyei
		Mule Shadrack¹, Noah Angwenyi², ³Asenath Nyantika, ⁴Mary Wosyanju, ⁵Phanice Wangila, and ⁶Charles Ngsuta. : Compliance of national integrated pest management framework and other relevant national policies on pest management by farmers in lake Victoria basin.		
		Mecha Ginn Abere : Innovative knowledge capture and creation tools used by the Agricultural Extension Agents in Nyamira County, Kenya.		
		Beatrice Cheptoo Korir¹, Ronald Bituka², Abu Ahmed Adamu³ : Enhancing Productivity through Access and Use of Agricultural Information in Tea Farming in Kenya: An Opinion Paper.		
		Mutai, A.K.¹; Prof. Kibett, J. K.²; Ogunyini, M. E.³ : Effect of Agricultural Value Chain Extension Approach on the Adoption of Dairy Cattle Milk Production Technologies By Smallholder Farmers in Kericho, Kenya		
		Dismus Kipruto Yego Noah Kibet, Millicent Otiende : Effect of Climate Smart Agricultural Technologies on poverty Level among Small-scale Farmers in Uasin Gishu		
		Beatrice Ndegwa and Thomas Matonyei : Selected Growth Characteristics of Stripped Bamboo (<i>Bambusa vulgaris</i>) Variety Striata under Vegetative Propagation of Cuttings and Layering		
		William Rotich Kiprono :Towards a Revitalized Forestry Policy and Regulatory Regime In Kenya In The Light Of Climate Change: A Comparative Review		
2:00 pm 3:30 pm	Room I/Senate Chamber	Sub-theme: II Presentations	Moderator: Dr. H.W. Sang	Rapporteur: Dr. P. Chepkwony
		Gladys Mosonik, Hellen. W. Sang, Williter Rop : Innovative E-Human Resource Management Practices And Organization Performance In Commercial Banks In Nakuru County		
		Lilian Atieno Muma, Joseph Kiprono Kirui, Hellen Sang, Williter Rop : Talent Attraction Practice, Organization Culture and Sustainable Organizational Performance in Chartered Universities in Kenya		
		Dr. Pius Chumba : Moderating effect of Employee Training on the Relationship between ISO Certification and Enrolment of Students in Public Universities in Kenya		

		Phyllis A. Walaba: Productivity Assessment Of Hospitality Management Graduates In Uasin Gishu County	
		Thomas Ng'ambwa, Dr Tecla Sum, : Acquisition of Nursing Skills and Supervision in Technology Enabled Learning in Kenyan Universities	
Room II	Sub-theme III Presentations	Moderator: Dr. Thomas OtienoJuma	Rapporteur: Dr. V. Ngeno
		Thomas Otieno Juma, Robert Wesonga, : When Songs are Dry! African Political Economy Affirmation and Expression in Songs	
		Hellen Kesui: Securing The Life of Students In Universities": A Case Study Of University Of Kabianga	
		Agnes Muthoni Njuguna: The Education Functions of Traditional Healers' Street Advertisement Registers of Eldoret, Kenya	
		Wesonga Robert, Thomas Otieno Juma: Semiotics of the Stateless: Significance of Objects of Citizenship among Immigrants, Displaced and Minority Communities in Kenya	
		Williter Chepkemai Rop, Eric Mibei , : Factors Affecting Completion Of Graduate Studies In Public Universities: A Case Study Of University Of Kabianga, Kenya	
		Dr. Solomon Kaptingei Too : Reinvigoration of Language Cognition and individual language teacher Maxims in second language pedagogies	
		Rebecca Jepkemei Lagat: A Comprehensive Approach to the Four Pillars of SDGs: Education, Gender, Security, and Interstate Innovation in the 21st Century	
		Dr. Salim Sawe: Invention and Innovation Impasses Against Sustainable Development Goals	
		Peter Gikonyo , Mercy Mweni Kathina & Maureen Achieng' Ooko: Strengthening the Role of Schools in the Promotion of Public Integrity for Sustainable Development Goals in Kenya	
Room III	Sub-theme IV Presentations	Moderator: Prof. E. Nyangena	Rapporteur: Mr. A. Koskey
		Meshack Chesere, Matthew Komen, Shaleti Abdalla. Revolutionary Automated Resuscitation Machine: Enhancing Patient Outcomes through Standardized Chest Compressions and Rescue Breaths	
		Dorcas Chelangat Bore, Wesley Bor, Faith Onyangore, Isinta M Elijah: Unveiling the Power of Nutrition: Exploring the Dietary Practices of Adult Patients Diagnosed with Diabetic Neuropathy - A Cross-Sectional Study	
		Faith Jerono Kimutai, Wesley Bor , Peter Chege: Predictors Associated with Double Burden of Malnutrition among Child-Mother Pairs in Kericho County.	
		Robert Amdany, Irene Chepkorir Chepkwony: Investigating the Spatial and Temporal Variability of Flavonols in Selected Kenyan Leafy Vegetables	
Room IV	Sub-theme V Presentations	Moderator: Dr. R. Langat	Rapporteur: Dr. Otanga
		Calvince Fwaga, Wily Mukuna, Levi Otanga: Numerical Investigation of Option Pricing Using Black-Scholes-Merton Partial Differential Equation with Non-Constant Volatility and Transaction Cost	
		Hillary E. Aradi, Enoch K. Rotich, Fred W. Masinde : Smart Grid Meter Reading Application Utilizing the All-Optical Wavelength Reuse Technique	

	Room V	Sub-theme VI Virtual	Moderator: Dr. S. Mule	Moderator: Dr. F. Onyangore
		Jamgun Jensen Iravonga¹, Muli Maingi², Benedict Ondiek Alala³, Consolata Ngala⁴ :Effect of Integrated Financial Management Information Budgeting System on Financial Management in County Governments, Kenya		
		Rose W. Gachogu : Action of The Dihedral Group Dn On Sets Of Non-Diagonal Vertices Of A Regular N – Gon		
		Anne Lodenyi Bulimu* ,Samuel O. Onyuma : Transforming the Bottom Line: How Artificial Intelligence is Reshaping the Future of Accounting and Finance		
		Richard S. Mbithi, S.O Onyuma : Impact of Financial Technology to the Banking sector		
		Eddah Cheruiyot : Evaluating Digital Innovations and Emerging Technologies for Consultative Training Delivery Through Virtual Learning Environment (VLE)		
		Lelgo Samwel^{1*}, Kiplimo Joyce¹, Kamunya Samson² and Mule Shadrack¹ : Shading regimes with processing and seasonal effects on anthocyanin content in Kenyan purple tea cultivar in different sites		
		Titus Towett*, Joseph Ngugi Kamau, David Wafula Wekesa : Techno-Economic Analysis of Non-Carbonized briquettes from Prosopis Juliflora with Binary Combination of Maize Cobs and Bagasse Agricultural Waste		
		Naini Kararei¹, Simon Kitiyo² & Danson Lemein³ : Influence of Entrepreneurship on Socio-Economic Empowerment in Registered Youth Groups in Kenya: A Case of Makadara Sub-County, Kenya		
3.30:pm 4:00pm	Main Hall	Book Launch	DVC A&F	Prof J. Kibet
4:00 pm 4:30 pm	Main Hall	Closing Ceremony	DVC PR&D	Rapporteur: Dr. L. Ochola
4:30 pm 5.00 pm	Health break and Exhibitions		Hospitality Team & Exhibitors	

Sub-theme I:Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development.

Sub-theme II: Innovative Approaches in Economic, Business Practices for Sustainable Development.

Sub-theme III: Education, Gender, Security and Inter-state Innovations and Practices for SDGs.

Sub-theme IV: Innovative Approaches in Preventive, Curative and Rehabilitative Healthcare

Sub-theme V:Innovation and Practices in Science, Technology, Engineering and Mathematics for Sustainable Development.

Sub-theme VI: Research and Technology Commercialization.

ABSTRACTS

EFFECTS OF COLCHICINE TREATMENT ON LEAF SURFACE AREA OF SELECTED MULBERRY ACCESSIONS Sub-Theme: Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Abstract

Mulberry belongs to Moraceae family, with different species found in different regions including Asia and Africa. For economic impact, especially in sericulture, morphological characteristics of the plant are key when targeting optimum yield and quality silk. However, this has been elusive due to low quality mulberry leaves especially in Kenya. Several biological techniques have been investigated to enhance the yield and quality of mulberry leaves. However, such studies are yet to be carried out for mulberry in Kenya. To enhance leaf surface area and other morphological characteristics of mulberry leaves, a study was carried out to evaluate the use of aqueous colchicine in four randomly selected mulberry accessions, that is, Ex-Limuru, Ex- Embu, Ex-Ithanga, and Ex-Thika. The experiment was laid in a completely randomized design (CRD) with six aqueous colchicine concentrations (0%, 0.1%, 0.2%, 0.3%, 0.4% and 0.5%) with four replications. Data was collected on changes in leaf surface area over time and subjected to Analysis of variance (ANOVA) using R version 4.3.1 statistical analysis software at $p \leq 0.05$. Results revealed that there was an increase in leaf surface area from 0.2% aqueous colchicine across the four accessions. These results imply that colchicine may have induced polyploidy in the mulberry plants thereby increasing leaf yield. Further research should be carried out to determine the ploidy levels in the colchicine treated plants.

Keywords: Mulberry accessions, Morphology, Colchicine, Leaf area

COMPARATIVE ANALYSIS OF RISK PERCEPTION AND RISK MANAGEMENT STRATEGIES AMONG VEGETABLE GROWERS IN PUNJAB STATE, INDIA AND NAKURU COUNTY, KENYA Carolyn Cheroftich^{1*} and Manmeet Kaur²

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ABSTRACT

Vegetable growers face a diversity of risks, especially in developing nations. The risks are increasing because of globalization, ravages of climate change and emerging pandemics. In this study, we have carried out an investigation to establish risk perception, risk management strategies and their barriers by vegetable growers in Punjab State, India and Nakuru County, Kenya. The target population was 1000 vegetable growers and a sample size of 200 growers was arrived at by use of Cochran Formula. Using an ex-post facto study design, data was collected from the 200 small scale vegetable growers with the aid of an interview schedule. Analysis was carried out using descriptive and inferential statistics of multiple response, Mann-Whitney u test and multiple regression. From the findings, market risks were determined as a leading source of risks in the two regions. The main risk management strategy employed by 77% of the growers in Punjab and 79% in Nakuru was use of Improved agricultural practices. 63% of growers in Punjab and 62% in Nakuru used market survey as a strategy. The major barrier to risk management in Punjab was lack of information on pests and diseases at 53%; and in Nakuru, it was lack of access to capital at 57%. This study seeks to provide an understanding to existing risks and suggest areas of improvement on efforts for risk management and reduction.

KEYWORDS: Barriers, Risk, Risk Management Strategies, Risk Perception, Risk Sources.

DETERMINATION OF RADON-222 CONCENTRATION LEVELS IN UNDERGROUND WATER IN BUNGOMA SOUTH SUB-COUNTY, KENYA

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ABSTRACT

SUB – THEME: Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

The activity concentration levels of radon-222 in underground water in the Bungoma south sub-county, Kenya were determined by taking thirty water samples. Measurement of the collected water samples was done in-situ using the RAD7 detector with RAD7-H2O accessory with the aid of the Water Regulatory Authority. The collection points were: Sang'alo, Musikoma, Marakaru, Tuuti, Namaloko, Sasuri, Siaka, Siritanyi, Bwema and Bungoma town. Ten water samples were taken from each source: boreholes, wells and springs. The water was collected in a pail with and the vial placed at the bottom of the pail and allowed to fill. The 250ml vial was capped while still under the water to ensure that there were no bubbles in the vial. The cap was tightened, removed from the pail, dried and labelled ready for measurements. Measurement was done immediately after the collection to avoid any radon from decaying due to its short half-life. The radon activity concentrations were obtained through a printer connected to the RAD7 detector for each sample collected which took a period of about an hour for a sample to be analyzed. The highest value was recorded in wells with a value of 303 ± 8 kBq/m³ at Kanduyi well and the lowest in boreholes with a value of 126 ± 11 kBq/m³. Most of the underground sources recorded high activity concentration levels with a mean of 269 ± 5 kBq/m³ in wells, 213 ± 8 kBq/m³ in boreholes and 290 ± 8 kBq/m³ in springs. All the averaged obtained activity concentration values from the three sources were above the recommended value of 100 Bq/l by world health organization. Hence, radon activity concentration in the underground water at the study area should be closely monitored. Residents of the study area should boil the water or water should be left open to allow escape of the radon gas. This lowers the activity concentration levels in the drinking water.

KEY WORDS: Activity Concentration, Radon – 222, Underground Water Sources, RAD7 Detector, World Health Organization

POVERTY IN THE FACE OF GLOBAL-GAP STANDARDS: THE CASE OF SMALLHOLDER FRENCH BEANS FARMERS IN KIRINYAGA COUNTY, KENYA

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Abstract

Majority of smallholder French bean farmers in Kenya produce for export market with an objective to alleviate household poverty. Export markets are seen as lucrative and therefore ability to improve household income and consequently reduction in household poverty. However, export markets require compliance with Global-GAP standards. Compliance and certification processes of these standards are costly and thus raise a concern on their effectiveness in addressing the household poverty. Currently, studies to determine the link between compliance with Global-GAP standards and French beans farmer's poverty status are limited. Using primary data (collected using structured and unstructured questionnaire) from 492 respondents (Global-GAP certified and non-certified French beans farmers) selected using systematic random sampling and Foster-Greer-Thorbecke (2010) measures of poverty, the study determined the impact of Global-GAP certification on French beans farmer's poverty status. Results show that, majority of the certified French beans farmers (42.7 percent) were poor relative to non-certified (29.9 percent). Poverty depth and severity was also high among certified farmers at 29 percent and 25.2 percent respectively. The results suggest that

suggests that, since compliance and certification processes are costly, there is high likelihood that the processes contributed to the losses incurred by the Global-GAP certified farmers. Government therefore should come up with policies that are geared towards lowering costs related to Global-GAP compliance and certification processes. This will in turn increase household income and thus household poverty reduction.

Key words: French beans farmers, Global-GAP Standards; Household poverty

INNOVATIVE KNOWLEDGE CAPTURE AND CREATION TOOLS USED BY THE AGRICULTURAL EXTENSION AGENTS IN NYAMIRA COUNTY, KENYA.

Theme: Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Abstract

In the global stage, knowledge is gaining traction as a vital resource enabling people and organizations achieve competitive advantage. Managing this knowledge has therefore become key to gaining the advantage and charting the way forward for many organizations. Many challenges facing agricultural and rural extension can be attributed to the un-captured and un-shared knowledge right from the indigenous knowledge systems to the current innovative technological practices. For this knowledge to be captured and created, innovative tools are required by the agricultural extension agents. This research sought to find out which innovative knowledge creation and capture tools were used by extension agents in Nyamira County. The research used a cross sectional survey design. This research targeted all the extension officers in Nyamira County. The researcher sent out 35 structured questionnaires through the Sub County Extension office and 30 were returned fully filled. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 23 and Microsoft excel was used to generate graphs and tables. The results indicated that conventional methods such as mobile phones, office computers, cameras, written documents, questionnaires, exit interviews and knowledge harvesting as the most commonly used tools for creating and capturing knowledge in Nyamira County. New and innovative tools such as E-learning, Electronic Performance Systems, blogs and smartphone applications (M-apps) are yet to pick up at 1%. Majority of the tools used were privately owned (47%) with 37% provided by government. The study recommended regular capturing of knowledge both formally and informally and not restricted to designated meetings, use of innovative systems and provision of tools for creating and capturing knowledge to extension agents.

Key words: Innovation, Knowledge, Capture, Create, Tools

DECRYPTING THE EFFECT OF COVID-19 PANDEMIC ON FOOD AND NUTRITION SECURITY IN KENYA

Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Abstract: Globally, there has been tremendous effort towards ending hunger and malnutrition in all its forms by the year 2030. These efforts have not realized the desired results due to conflicts within and without countries, climate variability and extremes, and economic slowdowns and downturns. In Kenya, food and nutrition insecurity existed even before the emergence of COVID-19 pandemic. With the occurrence of the

pandemic, food systems and food supply chains relied upon by the population to access sufficient and affordable food of high nutritional value further worsened the already unfavorable situation. The gradual shocks and interruptions on food systems and food supply chains by the climate change, high poverty levels, income inequality, high cost of healthy diets, labor shortages coupled with global recession and pandemic containment measures required urgent attention and timely interventions to protect the vulnerable population. This view point paper provides an insight of the effect of COVID-19 pandemic on food and nutrition security, and the trends affecting food systems. The paper adopted descriptive approach which utilized an array of contemporary scholarly views and their research outputs on food and nutrition security which resonated with the Kenyan situation. The study findings emphasized on the need to adopt a multidisciplinary and multifaceted approach when addressing food and nutrition security even at the time of a pandemic in order to achieve the intent for the realization of the right to food of high nutritional value. The study revealed that Kenya should adopt diverse strategies for enhancing food and nutrition security, thus including crop diversification, crop bio-fortification, research on genomics and precision breeding, agroecology technique application, capacity building of extension workers, investing in climate smart agriculture and adoption of human centered design model to enhance resilient food systems. The findings will be vital to policy and decision-makers responsible for food and nutrition security.

Keywords: COVID-19, Decrypting, Food and Nutrition Security, Kenya

EVALUATION OF SOCIAL CAPITAL ATTRIBUTES AS PREDICTORS OF COLLECTIVE ACTIONS AMONG SMALLHOLDER FARMERS IN TINDERET SUB COUNTY, KENYA

Sub-Theme

Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Abstract

Small farms make up 85% of farms worldwide. In Kenya, agriculture sector is similarly dominated by smallholder farmers. To overcome constraints imposed by small units and for sustainable development, smallholders organise themselves into groups or farmer producer organisations (FPOs) to access services. They exploit elements of social capital; social networks, norms and trust to enhance cooperation for collective actions. It is often assumed that social capital attributes among farmers' groups are exploited for positive collective actions such as access to credits and joint sale of aggregated produce. Social capital attributes, however, differ from one farmer organisation to another. This study evaluated levels of social capital attributes among farmers from value-chain linked groups. Predictive value of the social capital indicators on the desired outcome of collective actions was investigated. Based on a retrospective study design, interviews were conducted on 72 farmers drawn from 9 FPOs with 215 members. Attitude scales ranked 1 to 5 were used to gather opinions of participants on the attributes. Participants were sampled by purposive and multi-stage sampling schemes. Single-sample Wilcoxon test was used to analyse strength of each attribute among participants. Median value for indicators of social trust, social participation, norms, common vision and social networks were significantly higher than 'neutral,' $P < .05$. Collective actions in inputs-acquisition and produce-selling did not differ significantly from 'neutral' ($P > .05$). The mean for social capital attributes had strong predictive ability on collective actions as tested by Spearmans' Rank analysis using SPSS; $R^2 = .382$, $P = .000$. The collective actions in learning, inputs-purchase, produce-selling, price negotiations and market-information seeking could be predicted from the social capital attributes evaluated. It is recommended that stakeholders build capacity of FPOs, particularly for collective actions in inputs-acquisition and marketing of produce for sustainable development.

Keywords: (Social capital, Farmer groups, Collective actions)

The Role of Popular Songs in Climate Change Awareness and Adaptation in Kamba Community of Kenya

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Abstract:

This research paper explores the significant role that popular songs play in raising awareness about climate change and promoting climate adaptation strategies in Kenyan Kamba community. Climate change is a pressing global issue with far-reaching implications for countries like Kenya, where agriculture and natural resources are central to livelihoods. Through a comprehensive analysis of the lyrics, themes, and impact of popular songs, this study sheds light on how music serves as a powerful tool for conveying climate change messages, educating communities, and fostering positive behavioral change. The research employs a mixed-methods approach, incorporating qualitative content analysis, surveys, and interviews to gather data from artists, community members, and experts in climate change communication. The findings highlight the potential of popular songs as effective vehicles for climate change communication and suggest recommendations for enhancing their role in climate change adaptation strategies in the Kenyan communities

Key Words: Adaptation, Popular, Climate Change

ROLE OF AGROFORESTRY IN ENVIRONMENTAL CONSERVATION AND FOOD SECURITY IN KENYA

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Abstract

Trees play a crucial role in almost all terrestrial ecosystems and *provide a range of important products and services to rural and urban people*. Environmental conservation and food security cannot be separated if a country wishes to recognize the value of the two. The study therefore examines the role of agroforestry and environmental conservation on food security in Kenya. The objectives of the study were to find the role of agroforestry on environmental conservation and to explore the role of agroforestry on food security in Kenya . The study methodology is desk research following the extraction of data from secondary sources mostly online articles with global, regional and local presence and using the findings for discussion, and conclusion and for making recommendations from the findings opening room for further research. The findings of the data revelation indicate that agroforestry which is the planting of crops and planting of trees plays a major role in the conservation of the environment and also providing food for families and surplus for sale. The tree species should be friendly to soil conservation for example grevillea and the crops recommended should be earlier maturing . The study also found out that although agroforestry can conserve the environment and also provide food security its adopted at minimal level due to dwindling land as the population swells both in towns, cities and rural areas .The trees from agroforestry can be harvested for timber and paper making which means agroforestry can be adopted as a commercial venture. The findings therefore recommends the country and related agencies to come up with resources and personnel that promote agroforestry to promote environmental conservation and at the same time food security in Kenya and beyond .The country to provide individual families with early maturing varieties of trees and crops for a sustainable income .This method will help in saving forests that would otherwise be destroyed through collection of firewood and cutting trees to burn charcoal.

Keywords: Agroforestry, environmental conservation and food security.

KENYAN GOVERNMENT COMMUNICATION IN THE SUDAN CRISIS: AN ANALYSIS OF @ForeignOffice KE TWITTER PAGE

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ABSTRACT

In times of crisis, such as wars or natural calamities, a government's communication strategy is an important asset as it reassures the citizens and builds resilience. This paper explored how the Government of Kenya (GoK) through the ministry of foreign affairs (MOFA), used twitter as a method of engagement to engage with citizens during the Sudan crisis within the context of crisis communication. The study sought to establish key issues raised during the crisis, the nature of communication between key crisis publics, tone used and

the dilemmas experienced by key publics during the interaction. The interactions are confined to only those on the @ForeignOfficeKe twitter page since the beginning of the Sudan crisis on 15th April for a period of two weeks. Government officials, Crisis publics (Sudan Crisis) and MOFA were the focus of the study. The study used quantitative content analysis to examine how citizens and authorities interacted during the Sudan crisis. All the 18 twitter messages and the 112 comments made during the study period were picked for analysis. Situational crisis communication theory was used to provide direction. The analysis found that the government's primary message focused on the spread of information about the authorities and their actions, the sequence of events leading up to the crisis and directions of what those caught in the crisis should do and rescue plans. The overall crisis publics' tone was negative with most of the messages being criticism of the government and their actions. The study further established that active two-way participation between authorities and crisis publics was lacking. As the talks were taking place, the active crisis public provided information, asked and answered questions, and voiced their thoughts. The paper also brought out bottlenecks that are likely to frustrate effective and efficient communication during the crisis. These include rigidity of government authorities in terms of taking timely and appropriate measures, providing quality information and disparity of knowledge. This study has shown that crisis publics are a resource that can be used by the government to identify the information needs of the public. This, therefore, calls for the government to establish two-way communication on their social media pages to ensure that the crisis public needs are met.

KEYWORDS: Crisis, communication, crisis publics, Kenya

RELATIONSHIP BETWEEN SELECTED FACTORS AND PERFORMANCE OF OUT-OF-SCHOOL AGRICULTURAL YOUTH GROUPS: A CASE OF KIPKELION EAST AND KIPKELION WEST SUB-COUNTIES, KERICHO COUNTY.

INNOVATION AND PRACTICES IN AGRICULTURE, FOOD SECURITY AND NATURAL RESOURCES CONSERVATION FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

Out-of-school agricultural youth groups are among the youth programs managed by the ministry of youth in Kenya with the main aim of creating jobs for the youth. Out- of -school agricultural youth groups in Kipkelion East and Kipkelion West face a lot of challenges hindering their performance. The purpose of this study was to establish the relationship between selected factors and performance of out-of-school agricultural youth groups in the study area. The study was guided by two objectives; to establish the relationship between adequacy of market and performance of the groups and to establish relationship between knowledge and skills of group members and performance of the groups. The target population comprised of 164 members enrolled in the 6 registered out- of- school agricultural youth groups in the two sub counties. Proportionate, stratified random sampling was used to obtain 116 members from different groups. Ex post-facto research design was used for the study. A structured questionnaire was used to collect data from group members and analyzed using means percentages and frequencies. Spearman's rank order coefficient was used to test the stated hypotheses at alpha level of 0.05. The results indicated a statistically significant relationship between adequacy of market, knowledge and skills of group members and performance of out-of-school agricultural youth groups. It was recommended that the knowledge gap identified be bridged by agricultural extension officers and market channels be made efficient for group produce.

Key words

Out-of-school agricultural youth groups, Selected factors, Performance, Kericho County

ROLE OF GOVERNMENT AGENCIES AND THEIR CHALLENGES IN SUSTAINABLE FOOD SECURITY IN KENYA

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Abstract

Food security is key to a nation's development and food security is a challenge to the development of a nation. Most developing countries Kenya inclusive have a challenge to sustain food security for its citizens and to overcome this challenge joint efforts should be taken by government and responsible agencies. The study examined the role of government agencies in ensuring the country achieves its food security goal which is a human right. The study undertook a desk research approach by getting information from various online sources of recent publications from Kenya and beyond. The study findings revealed that there are many government agencies working towards sustainable food security in Kenya among them is the Ministry of Agriculture divided into Crop Development and Agricultural Research, Livestock, Fisheries and Blue Economy, and Cooperative Development, we have the universities like Egerton, Laikipia, University of Nairobi. The study found out that the major challenges is lack of funds , climate change and lack of skilled manpower and also corruption-run agencies that make initiated projects fruitless. It also cited the increasing population and negative attitude by youths toward agricultural ventures as they prefer cities as avenues for greener pasture searches. The study recommends therefore introduction and promotion of biotechnology due to reduce lands, promote agriculture by corruption-free practices, and mitigate climate change for example introducing drought-resistant crops and adding value to harvests due to a lot of wastage from lack of market during bounty harvests.

Keywords: Agricultural agencies, Food security.

THE MEDIATING EFFECT OF INSTITUTIONAL SUPPORT ON AGRIBUSINESS INCUBATION AND LIVELIHOOD SECURITY IN BUNGOMA COUNTY

Sub Theme: Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Agribusiness is a critical driver of economic growth and the achievement of the Sustainable Development Goal of Zero Hunger. In Kenya the benefits of agribusiness are highly constrained and yet there exists potential in agribusiness incubation and institutional support that act as a conduit to secure livelihoods. The specific objective of this paper was to determine the mediating effect of institutional support on agribusiness incubation capitals and livelihood security in Bungoma County. The study was guided by the DFID Livelihood Framework. Pragmatic paradigm was employed in the study. A cross-sectional analysis of Bungoma North, Kanduyi, Bumula, Mt Elgon and Webuye West sub-counties, with a total household population of 194,513 was done. Sub-counties were purposively sampled forming the clusters of the study. Simple random sampling was applied to select a sample size of 399 households, and purposively selected, 23 key informants and 10 FGDs. Data were collected using questionnaires, observation schedules, document reviews and interview guides. Qualitative data were thematically analyzed and presented as narrations. Descriptive statistics were analyzed through frequencies, percentages and means. Inferential statistics employed ANOVA, Chi-square test, and logistic model. The findings show that agribusiness productivity is constrained by the land parcels size, pests and diseases, transportation and storage infrastructure. The study concluded that institutional support had varied statistically significant mediating role on the livelihood capitals for agribusiness incubation. In conclusion, to achieve a sustained increase in production, integrated strategies and policies are essential in reducing risks and building resilience among Agro entrepreneurs. Institutional support is critical in the optimal agribusiness transformation and mobilization of the livelihood capitals to enhance productivity, comparative advantage and competitiveness. The study recommends collaboration of stakeholders and institutional support efforts to

be harmonized with the communities' inherent potential for the attainment of the desired livelihood security.

Key Words: *Agribusiness Incubation, Livelihood Security, Institutional Support*

ENHANCING PRODUCTIVITY THROUGH ACCESS AND USE OF AGRICULTURAL INFORMATION IN TEA FARMING IN KENYA: AN OPINION PAPER.

Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation For Sustainable Development.

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Abstract:

This opinion piece investigates the significance of agricultural information access and use in the context of tea farming in Kenya and advocates for its role in increasing productivity. Tea farming is an important industry in Kenya, contributing significantly to the country's economy and providing employment to a large number of people. However, the farmers are faced with challenges of restricted access to reliable and timely agricultural information that will enhance their productivity. Therefore, the paper argued that improving access and use of agricultural information can revolutionize tea farming practices in Kenya. It emphasizes the potential benefits of providing comprehensive and up-to-date information to tea producers, ranging from new growing methods to market trends and sustainability practices. The papers also overlook the various agricultural information sources available to tea farmers such as government programs, agricultural extension agencies, research institutions, and digital platforms. Key challenges such as inadequate infrastructure, language barriers, and a lack of understanding of available resources were also examined. The study also suggests potential remedies, such as the creation of robust information networks, customized training programs, and the incorporation of technology to overcome the knowledge gap. In conclusion, this opinion paper argues for concerted efforts by policymakers, agricultural organizations, and development agencies to prioritize and invest in enhancing access to agricultural information for tea growers in Kenya. It states that empowering tea farmers with knowledge and information is vital for altering the tea farming sector, stimulating innovation, and attaining sustainable agricultural development in the country.

Keywords: *Agricultural information, Access and Use, Sources of information, Tea farmers, Kenya*

FACTORS DETERMINING ACCESS TO CREDIT BY PRIVATE FOREST FARMERS IN KIAMBU COUNTY, KENYA

Sub-Theme: Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Abstract

Forests are significant resources capable of mitigating multiple global challenges and enhance sustainable development universally. Forests contribute approximately USD 468 billion or 1% of the global gross value added to GDP. The livelihoods of over 1.6 billion people depend on forest goods and services. Therefore, adequate and sustained financing of forest development enhances continued supply of forest products and services including reduced effluents, emissions and wastes. Forest establishment in terms of land acquisition, preparation, seed/seedlings purchasing and maintenance is quite expensive. Access to credit facilities may alleviate this status among private forest farmers (PFFs), for them to venture into forestry and out scale their operations. This study examines factors affecting access to credit facilities among PFFs' households in Kenya's densely populated Kiambu County. Purposive and snowball sampling were utilized to identify five sub-counties (Limuru, Lari, Githunguri, Gatundu south and Kiambaa) with considerable PFF and collect data using structured questionnaire from 100 households with more than acre of land, respectively. Majority (57%) of households are male headed. About 8% had no formal education while 29 percent had attained tertiary education. Conversely, about 39% had access to extension services. Logistic regression results showed that age ($p=0.041$), gender ($p=0.044$), size of forested land ($p=0.050$), income ($p=0.008$), forest extension advice ($p=0.004$), interest rate ($p=0.033$) and membership to a forest growers' group ($p=0.016$) were significant ($\alpha<.05$) determinants of access to credit by PFFs in Kiambu County. The null hypotheses were thus rejected. Financial institutions should not discriminate either gender in credit provision. PFFs should allocate more land to growing trees. Credit providers should supply credit to PFFs at low interest rates. Extension agents should strengthen their role as the link between research and the PFFs.

Keywords: access to credit; forest cover; investment capital; logistic regression; private-forest-farmers; Kenya

ROLE OF TREE BREEDING AND IMPROVEMENT IN COMMERCIAL FORESTRY AMIDST CLIMATE CHANGE ADAPTATION IN KENYA.

Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Abstract

Tree breeding and improvement is the quality-control check unit of tree products and services, hence guide commercial plantation establishment and management. Commercial forestry in Kenya is mainly practiced on three tree species of *Cupressus lusitanica*, *Eucalyptus* species and *Pine* species, which are main sources of forest products such as pulpwood, sawlogs and transmission poles translating to a cumulative value of about 2,181,400m³ of wood products annually. However, there is limited knowledge on how tree breeding and improvement is influencing commercial forestry in Kenya. This article is a critical review of the role of tree breeding and improvement in promoting commercial forestry sector while addressing ravaging effects of climate change and contributing towards government strategy 30% forest cover by 2032. A series of secondary data were gathered from three databases; Google Scholar, Science direct and CORE using pre-defined keywords. The data was reviewed based on PRISMA 2020 guide on systematic literature review. Screening of titles and abstracts and full texts was done to ensure relevance. The study shows significant contribution of tree improvement with current Mean annual increment of *Eucalyptus grandis*, *Cupressus lusitanica* and *Pinus patula* at 50, 25 and 30m³ha⁻¹yr⁻¹ respectively. Diversification of commercial tree species to nine (9) key species towards climate resilience. Availability of high-quality germplasm, progeny and provenance trials. Genetic infusion tests of *Pinus tecunumanii*, *Pinus maximinoi* and pine hybrids are ongoing. The gaps identified were in the dynamism of global technology practices, emphasis on skilled labour, aligning to international standards and equipment. This review will be essential to policy makers and implementers to prioritize developing

breeding in commercial forestry which has a major role in sustainable development and climate change mitigation and adaptation. The gaps identified will be fields for further research by scholars towards productivity in commercial forestry.

Keywords: Tree breeding, commercial forestry, climate-change

COMPLIANCE OF NATIONAL INTEGRATED PEST MANAGEMENT FRAMEWORK AND OTHER RELEVANT NATIONAL POLICIES ON PEST MANAGEMENT BY FARMERS IN LAKE VICTORIA BASIN.

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Abstract

The study on compliance of national integrated pest management framework and other relevant national policies on pest management by stakeholders in 11 Counties along the Lake Victoria Basin were collected through direct interviews with 120 farmers, 35 extension officers, horticultural organizations and key informant interviews within Lake Victoria Basin during the period of 2020 to 2022. The study established that the national framework on pest management is management through the following key institutions: National Environment Management Authority (NEMA), Pest Control Products Board of Kenya (PCPB), Agrochemical Association of Kenya (AAK), Kenya Plant Health Inspectorate Services (KEPHIS), Kenya Agricultural and Research Organization (KALRO) and Directorate of Occupational Safety and Health Services (DOSHS) among others. The study also established clear legal framework on pest management in Kenya and other international agreements relating to pesticides products manufacture, distribution, use and disposal of synthetic pest control products. It was found that 1345 synthetic pesticide products had been registered by PCPB for use on crops, 145 for public health, 101 as technical grade materials for formulation purposes, 35 listed as temporary registered products, 33 as banned products and 5 listed as severely restricted pesticide products in Kenya within the period of study. Out of 820 products sampled in the market and used for controlling pests in crops and animals, at least 30 active ingredients were recorded with 34% insecticides, 35% fungicides, 18% herbicides, 5% miticides, 2% acaricides, 2% nematicides and 1% for fumigicides, avicides, rodenticides, adjuvant, larvicides, termiticides of the total volume of products sampled. The most commonly used active ingredients in the products were: abamectin, alpha cypermethrin, acetamiprid, imidachloprid, mancozeb, metalaxyl, 2,4-D Amine salt, chlorpyrifos, dimethoate, diazon, cyproconazole, difenoconazole, propiconazole, deltamethrin, atrazine, Lambda-cyhalothrin, glophosate IPA, chlorothalonil, amitraz, pyrethrin, malathion, dichlorvos, tebuconazole, chlorothalonil, paraquat dichloride, acetochlor and difenoconazole being highly used in such products. Preliminary results shows 88% of farmers interviewed preferred the use of synthetic chemicals for management of pests and weeds while 2% reported use of non-chemical practices in their farms. The results also indicated high level of exposure to active ingredients on farmers with 36% complaining of health side effects such as acute headaches, skin rashes, ocular irritations, throat irritations, nasal catarrh, oral acetomatism, visual impairment, itching among others after long use of pesticide products on crops and animals. This may have been occasioned by poor work practices, hygiene measures and safety precautions, with 89% of the interviewed farmers indicating that they had not used any personal protective equipment (PPEs) while applying pesticide products in the farm. The results also showed low level of use of alternative pest control measures with 8.5% of all farmers interviewed indicating that they have used traditional plant extracts to control pests in crops and animals. The analysis also indicated that 1.95% of all the products registered by Pest Control Products Board of Kenya (PCPB) were biopesticides with bacillus thurindensis car: aizawai and paecilomyces lilacinus being the major active ingredients with 95% of interviewed farmers unaware of the availability of biopesticides in the market. The low uptake of integrated pest control practices may be due to lack of knowledge by farmers and unavailability of biopesticides in the local markets and therefore there is need to increase their availability, promote and train farmers on the use of alternative pest management practices to reduce overreliance to synthetic pest and weed control products and hence protect farmers from adverse effects of such products.

Key words: pesticides, biopesticides, policy, pests management, weed management.

EFFECT OF AGRICULTURAL VALUE CHAIN EXTENSION APPROACH ON THE ADOPTION OF DAIRY CATTLE MILK PRODUCTION TECHNOLOGIES BY SMALLHOLDER FARMERS IN KERICHO, KENYA

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Sub Theme: 1 -Innovation and Practices in Agriculture, Food Security and Natural Resources, Conservation for Sustainable Development

Abstract

Rural Extension Service Delivery System is a vital component in agricultural development initiative of any nation. Globally, many Governments and development partners in rural agricultural development initiatives, have gradually transitioned away from total state control of rural community and agricultural extension service delivery into adopting and supporting a more multifaceted system built on holistic participatory system commonly called Agricultural Value Chain Extension Approach (AVCEA). AVCEA is still relatively new in the field of agricultural extension service delivery especially in most of the developing countries, Kenya included and, especially so in Kericho County where its effectiveness is still yet to be fully investigated, and documented. The purpose of the study therefore, was to investigate the effect of agricultural value chain extension approach on the adoption of dairy cattle milk production technologies by smallholder dairy farmers in Kericho, Kenya. An ex-post-facto research design was adopted for the study. Systematic random sampling technique was used to select a sample of 132 smallholder dairy farmers from a target population of 500 smallholder farmers who had all been exposed to AVCEA. Eight (8) dairy cattle production experts, who work in the rural agricultural extension service, and the 6 representatives of the key dairy organizations were also included in the study. The data was collected using interview schedules, questionnaires and focus group discussion guides, and were analyzed using frequencies, percentages and Chi square with the aid of SPSS version 26.0. From the findings, it was concluded that an effective and competitive dairy cattle milk production value chain enterprise requires best, edge cutting technologies and services. The recommendation is that for the agricultural value chain extension approach (AVCEA) to provide effective and efficient impetus needed to drive the necessary change(s) in the smallholder dairy cattle milk production development agenda, behavioral scientists, agricultural practitioners, and policy makers should develop strategies to effectively cater for the extension needs of not only the farmers but also for all the other main actors operating at the different nodes of the agricultural value chain enterprise; and that the extension methodologies to be used should take cognizance of the nature and peculiarities of all the actors in the agricultural value chain enterprise structure. The findings of this research study may be of use to policy makers, stakeholders in rural development, researchers and development partners.

Keywords: Rural extension service delivery System (RESDS), Agricultural Value Chain Extension Approach (AVCEA), Agricultural value chain node, Agricultural value chain enterprise, dairy cattle milk production technologies, Kericho, Kenya

ECONOMETRIC ANALYSIS OF FACTORS AFFECTING MILK PRODUCTION: A CASE OF UASIN-GISHU COUNTY, KENYA

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ABSTRACT

The dairy sector plays an important role in the country's development and is particularly important in employment generation and poverty reduction. Livestock and its products are a major source of income to many farmers and play a critical role in agricultural intensification process through provision of vital animal proteins, draught power, and manure for fertilizer, fuel and income. The objective of the research was to identify and econometrically analyse the various factors affecting the dairy sub-sector and evaluate if farmers are efficient in the use of input resources as far as dairy production is concerned among the smallholder dairy farmers in Uasin-Gishu County. A combination of multistage, systematic and random sampling was used to select 111 dairy farmers from the three leading milk producing sub-counties in Uasin-Gishu county to form the source of primary data. A structured and open ended questionnaire was used to collect data. The data collected included: farmer's characteristics, inputs used in milk production, such as; labour input, capital base, land size used in dairying, amount of concentrates, dipping cost, type of veterinary services used and cost, frequency of extension visits, source and cost of Artificial insemination, credit accessibility and source, breed type, husbandry practice and price of milk per litre. Descriptive and Econometric analysis were used in analyzing the data. The study revealed that on average, dairy cows produce 7.02Lts/day. The research established that farmers ranked factors affecting milk production as follows; price of milk, inadequate use of concentrates, high cost of AI services, cost of veterinary services, credit, labour cost, capital land size and husbandry. Regression analysis using fitted Cobb-Douglas model explained well 86.9 percent of variation in milk. Marginality criteria (MFC = MVP) showed that farmers were inefficient in the use of concentrates, AI service and dipping. Producer price was too low and significantly affected milk production. All these factors were significant at 99 percent confidence level. Extension services, capital and land size were found to be efficiently used and were insignificant using the t-test criteria. In general, the study found out that farmers have ability to produce more than what they are producing now. Therefore, attention should be given to constraints identified and elimination of inefficiencies through use of quality feeds and planting more fodder crops since land is not a major problem. Farmers in the county should also venture zero grazing system which produces more milk than the current free range system. Farmers should also form strong co-operative societies to market their produce and earn better price. The government should support farmers by utilizing the tax paid by milk farmers to develop infrastructure for easy accessibility of the market. This will reduce wastage and shorten delivery time to the market.

Key words: Milk Production, Dairy sub-sector Uasin-Gishu, Econometric analysis, efficiency, Cobb-Douglas Production function

SHADING REGIMES WITH PROCESSING AND SEASONAL EFFECTS ON ANTHOCYANIN CONTENT IN KENYAN PURPLE TEA CULTIVAR IN DIFFERENT SITES

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Abstract

Current study seeks to look into the seasonal loss of purple pigmentation associated with anthocyanin content in the Kenyan purple tea (*Camellia Sinensis* (L.) O. Kuntze), namely TRFK 306, during the hot and dry (HD) periods. Anthocyanins are secondary metabolites responsible for coloration, physiological and biochemical processes and important in plant development and environmental interactions. The unique anthocyanin rich tea cultivars have numerous reported biological health benefits largely owing to anthocyanins content that includes high antioxidants capacity, antimicrobial, anti-carcinogenic, antiaging, antidiabetic agents, lowers blood fats amongst other useful properties used in food and pharmaceutical industry. Profiling of anthocyanins content in relation to changing climatic seasons in Kenya is essential in order to guide on the favorable conditions for maximum utilization and sustainability of these quality bioactive molecules throughout the year. The study determined the effects of varying shadings (SH), processing technique (PT), seasons (SS) and geographical sites (ST) on the content of Total

Monomeric and Total Individual Anthocyanins (TMA and TIA). Treatments involved: shading (0% unshaded/control, 30%, 60% and 90%), PT (Non-aerated and Aerated Cut, Tear and Curling (NACTC and ACTC) with Non-aerated and Aerated Orthodox (NAORT and AORT) purples teas, SS; Hot and Dry (HD), Cold and Wet (CW) and Warm and Wet (WW), ST; Timbilil-TRI Kericho and Kaputumo-Nandi Counties. TMA was determined by the pH Differential Method using a UV-Vis spectrophotometer while High Performance Liquid Chromatography was used in analyzing Individual Anthocyanin Fractions (IAF) then Total Fractions were tallied to obtain TIA content and data generated were analyzed using GenStat 15 Edition Software. The results showed significant ($p \leq 0.05$) variation in both the parameters considered (TMA and TIA) with all the treatments (SH, PT, SS and ST). The results can be used by the tea industry in environmental manipulation for sustainable production of high quality purple tea throughout the year.

Key words: Anthocyanins, Shading, Processing techniques, Seasons, Sites and Purple tea cultivar

SUSTAINABLE USE OF WATER RESOURCES BY NON-RESIDENT STUDENTS IN PUBLIC UNIVERSITIES IN KENYA: THE CASE OF THE UNIVERSITY OF KABIANGA

Sub-theme: Innovation and Practices in Agriculture, Food Security, and Natural Resources Conservation for Sustainable Development

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The immense increase in residential developments around universities to provide private accommodation for the rapidly growing population of university students has constrained the provision of a safe, clean, and sufficient water supply. This study's main objective was to assess water use sustainability and management by the University of Kabianga (UoK) off-campus students. The study relied on an exploratory approach that employed a descriptive survey. Its target population was the non-resident students (673 students) of the UoK, from whom a sample size of 250 students was selected. Simple random sampling was used to select the participants, while purposive random sampling was utilized to choose the study's private hostels (15). The tools for data collection included questionnaires, key informant interviews, and an observation guide. The collected data was analyzed using SPSS to generate descriptive statistics and other statistical outputs presented using tables and pie charts. According to the findings, most respondents (68%) relied on rainwater during the rainy season. However, most students (46%) relied on wells/boreholes, while 44% relied on private vendors during the dry season. Further, gender affects water demand since female respondents' average daily water demand was 12.4277lpcd higher than males'. Additionally, much water is used to maintain their hygiene and health since most students use water for kitchen purposes (57%), bathing (29%), and washing (14%). Further, most (69%) respondents experienced severe water shortages, especially during the dry seasons. The water prices fluctuate depending on the season and water demand. Therefore, a safe and more reliable water source suitable for all uses, like piped water, is required for their health and safety. Further, the landlords should partner with the water vendors to establish a fair water price to avoid student exploitation, especially in the dry seasons when the water costs depend on demand.

Key Words : Water shortage, Water demand

FINANCIAL LITERACY AND RETIREMENT PLANNING BEHAVIOUR IN THE KENYAN INFORMAL SECTOR

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Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development

Abstract:

This study addresses the critical issue of financial literacy and retirement planning behaviour within the Kenyan informal sector. The informal sector is a significant contributor to the Kenyan economy, yet retirement preparedness remains a challenge in this context. This research aims to investigate the relationship between financial literacy and retirement planning behaviour in the Kenyan informal sector, ultimately providing insights for targeted financial education programs.

Problem: Despite the prevalence of informal employment, many individuals in Kenya's informal sector lack adequate retirement planning, leading to financial insecurity in their later years.

General Objective: To examine the impact of financial literacy on retirement planning behaviour among informal sector workers in Kenya.

Methodology: This cross-sectional study will target diverse segments of the informal sector in five selected Kenyan counties. Data will be collected through online administered questionnaires and performance-based measures of financial literacy. Retirement planning behaviours will be assessed using a five-point Likert scale. The study will utilize statistical regression analysis to explore the relationship between financial literacy and retirement planning behaviour.

Conclusions: The research aims to establish whether a positive relationship exists between financial literacy and retirement planning behaviour in the Kenyan informal sector. The study expects to find that individuals with higher levels of financial literacy are more likely to engage in effective retirement planning.

Recommendations: The findings from this study can inform the design of targeted financial literacy programs tailored to the needs of the Kenyan informal sector. Policymakers and organizations can use these insights to promote retirement preparedness among informal sector workers.

Outputs: This research contributes to the growing body of knowledge on financial literacy and retirement planning in the informal sector, potentially leading to improved financial well-being for a significant portion of the Kenyan population.

Keywords: *Financial literacy, retirement planning behaviour, informal sector, Kenya, cross-sectional study.*

INTELLECTUAL CAPITAL AS THE KEY TO SUSTAINABLE INNOVATION: A SYSTEMATIC LITERATURE REVIEW

Innovation Approaches in Economics and Business Practices for Sustainable Development

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Abstract:

The connection between intellectual capital and sustainable innovation has been extensively explored. However, there remains a substantial need for further comprehension regarding how to conceptualize and address both intellectual capital and sustainable innovation within the current complexities of the business environment. The objective of this paper is to investigate the effect of intellectual capital on sustainable innovation. The study is anchored on resource-based theory and the systems theory. The research utilized a systematic review methodology, as guided by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Multiple databases search was conducted to identify relevant studies related. Only primary studies published between 2018 and 2023 were included, based on the predetermined selection criteria. The screening and selection process were performed in accordance with these criteria. This study appropriately referenced and acknowledged the secondary data sources and materials used. The study found that intellectual capital elements enhance sustainable innovation and in the long run putting the organization in the heights of competitive edge. This study concludes that there is a positive link between intellectual capital and sustainable innovation. Intellectual capital, within the framework of modern organizations, plays a pivotal role in fostering the identification and pursuit of opportunities that lead to the development of open sustainability innovation. It is recommended that policymakers stimulate innovation

by offering incentives, funding research and development, and creating a regulatory environment that fosters experimentation and risk-taking. It is recommended to undertake primary research studies. This study would be of significance to organisations that aim to leverage of intellectual capital for sustainable innovation.

Key words: *Intellectual Capital, Sustainable Innovation, Resource Based View Theory, Systematic Review*

INTRAPRENEURSHIP: IDENTIFICATION, NURTURING, AND RETENTION ON ORGANIZATIONAL PERFORMANCE AND SUSTAINABILITY: A CASE OF SMES IN KENYA

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Abstract

Globally intrapreneurs have contributed to the growth of their organizations. The study analyzed Intrapreneurship: Identification, Nurturing, And Retention on Organizational Performance and Sustainability: A Case of SMEs In Kenya which is a sector expected to create more jobs and improve Kenya's economy. The study utilized desk research by sourcing secondary data from online sources of recent publications to meet the objective. The findings revealed that the best way to identify intrapreneurs includes Looking for commitment and passion; these qualities will prove that a potential intrapreneur has the drive to challenge the status quo, break boundaries, and explore totally new ideas. They should show an internal motivation that transcends the incentive of profit alone. If you want to nurture and retain your company's intrapreneurs, you should start by giving them ample access to professional development and continuing education. There needs to exist an environment where employees are willing to take risks. The risk tests and increases intrapreneurial conviction and drive to keep on working. The study recommends intrapreneurs to be identified trained and motivated to help in the economic performance of organizations. The study recommends further utilization of the Internet for learning resources and collaboration and universities and institutes of higher learning to take this direction.

Key Words: Intrapreneurship, Identification, Nurturing, Retention and Organizational Performance .

INFLUENCE OF COVID-19 CRISIS ON HUMAN RESOURCE MANAGEMENT PRACTICES AND POLICIES: AN EMPIRICAL STUDY OF THEORIES

Innovation Approaches in Economics and Business Practices for Sustainable Development

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The Covid-19 pandemic shook almost all the organizations therefore creating a challenging and complex environment for human resource management practitioners. The HRM professionals had to find ingenious solutions to the challenges caused by the pandemic to ensure continuity of organizations and assist the employees in coping with the extraordinary crisis. The purpose of this paper is to review the human resource management practices and policies during the pandemic by exploring the influence of Covid-19 on HRM. It examines the HRM practices and policies established by the organizations during the pandemic and their efficiency in solving the issues encountered by the employees. A theoretical review includes analyzing

organizational behavior theory, resource-based theory, agency theory, human capital theory, and AMO theory. An empirical review of studies of various researchers concerning HRM practices and policies during the pandemic were considered. The study established that the Covid-19 pandemic significantly influenced the HRM policies and practices utilized by the organizations. The study concludes that the HR managers should devise new policies and procedures to manage employees who work remotely. The future recommendation is for organizations to come up with policies that will allow staff to work on permanent and pensionable terms at home. This will significantly reduce costs on commuter and house allowances thus reducing the ever-rising wage bill.

Keywords: Remote working, pandemic, Human Resource Policies,

E- SOURCING STRATEGIES ON PROCUREMENT PERFORMANCE OF TEA FACTORIES MANAGED BY KTDA IN SOUTH RIFT REGION

SUB-THEME: Innovation Approaches in Economics and Business Practices for Sustainable Development

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Abstract:

Emphasis has been put on ways of embracing procurement practices that result in cost reduction, given the tough economic times coupled by the COVID-19 pandemic. Tea factories are increasingly confronted with greater global competition and changing markets environment despite their effort to use e-sourcing strategies as a key pillar to improve procurement performance. E-sourcing has become a powerful tool which facilitates accountability and audit-ability. This study sought to determine e- sourcing strategies on procurement performance of tea factories managed by KTDA in South Rift Region. The study adopted a correlational research design where the target population was 19 respondents who were; Head of Finance, Head of Manufacturing, Head of ICT and Head of Purchasing. Census was used in selecting all the 19 respondents to respond to the study. The study collected primary data using a semi-structured questionnaire. Responses in the questionnaires were tabulated, coded and processed with the help of Statistical Package for Social Science (SPSS) version 26. The findings showed that there was a strong positive and significant linear relationship between procurement performance and E-Tendering ($r = 0.836$; $p < 0.05$), procurement performance and E-Prequalification, ($r = 0.741$; $p < 0.05$), procurement performance and E-Evaluation, ($r = 0.821$; $p < 0.05$). The model summary showed that the three E-sourcing strategies was explained by 81.7% of the variance in performance while 18.3% are explained by other factors which were outside the scope of this study denoted by the error term (e) in the regression model adopted by the study. The study concludes that tea factories need to adopt e-sourcing strategies for them successfully enjoy procurement benefits and hence reduce their operating cost. The study recommends that tea processing factories comply with the government regulations on digital economy.

Key words: E-Sourcing, E-Tendering, E-Prequalification, E-Evaluation procurement performance

A REVIEW OF THE SIGNIFICANCE OF 2N GAMETES IN POTATO BREEDING AND PRODUCTION OPTIONS OF ADOPTED CULTIVARS

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Sub -themes: Innovative and practices in agriculture, food security and natural resources

Abstract

Large proportion of potatoes are diploid therefore to ensure crossing of the wild species to the tetraploid cultivars, 2n gametes plays a fundamental role in potato genetic resource for both cultivated and wild species. 2n gamete have been utilized for ploidy manipulation in breeding in majority of higher plants the sources of 2n gametes starting with interspecific/intergeneric hybrids were studied in lily, wheat, roses, and

clover. Some of the spectacular features of interspecific hybrids enables both 2n egg and 2n pollen to be produced simultaneously by the same hybrids. Secondly, neither the two parents of the F1 hybrids nor their F1 sexual polyploid progenies can produce 2n gametes in any notable frequencies. Other causes of 2n gamete is meiotic mutation that is capable of disturbing spindle formation or cytokinesis, hence resulting in 2n gamete. This therefore call for proper detection of 2n gamete in ploidy breeding programs which can focus on pollen size, and analysis of ploidy of progenies, equally microsporogenesis analysis is equally used to detect 2n egg formation. The 2n gamete has played major role in creating new cultivars at higher ploidy level and creating bridges in which highly desirable genes from wild diploid species can be integrated into cultivated polyploid genetic pool. The objective of this review is to decipher the significance of 2n gametes in potato breeding.

Key words 2n gamete, hybrids and polyploidy

A COMPOSITE APPROACH TO ENHANCE BLACKLEG AND THE TUBER SOFT ROT RESISTANCE IN POTATO THROUGH A. TUMEFACIENS MEDIATED EXPRESSION OF AHL LACTONASE GENE AND INTROGRESSION OF QUANTITATIVE RESISTANCE FROM SOLANUM BREVIDANS

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Abstract

Most of the cultivated potatoes originating from North America have a narrow genetic base in parent breeding stock because most of them came from the same center of origin (Chile, and South America Peru). They consequently possess low resistance to the Pectobacterium and Dickeya which has been the trend despite decades in continuous research for developing both resistant or proper disease annihilation techniques that has proved futile. Most potatoes produced in Kenya are for cooking/table and some for processing industry. There is therefore a need to adopt a transgenic approach to combat the great damage that black leg and tuber soft rot causes in the farmers' fields, storage and on transit in Kenyan potato growing regions at large. Consequently, this research utilized the quorum sensing as a trojan horse to enhance blackleg and the tuber soft rot resistance in potato through transgenic expression of AHL lactonase gene and introgression of quantitative resistance from Solanum brevidans. This study was able to deliver a sustainable approach to combat economic losses brought about by black leg and stem rot disease thus reduce the huge losses and costs in seed potato production. Preliminary results showed that some lines had enhanced resistance leading to identification and recognition of tolerant/resistance potato cultivars for field evaluation. This is seen as a basic input that can be used by the potato pathology/breeding community to advance disease resistance breeding efforts across programs.

Key words: Dickeya, Enhanced resistance, Potato, Resistance

MAINSTREAMING KITCHEN GARDENING IN THE URBAN HOUSING APPROVAL PROCESS: A REVIEW OF EAST AFRICAN COUNTRIES

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Abstract

Kitchen gardens' contribution to food security and particularly urban nutrition is not clearly known. While most urban dwellers in developing countries practice it for subsistence farming, those in developed world utilize it for horticultural purposes. UNHABITAT projects that urban population has been on the rise over the years and is estimated that by the year 2030, 60% of the world population will be residing in urban areas hence reducing urban space for agricultural land use. With the swelling urban densities, urban poverty and the increasing negative impact of climate change on agricultural production, food security and nutrition is

likely to surge, therefore warranting a change of strategy from policy makers. This study (a) reviewed existing urban housing approval process in the East African countries: Kenya, Uganda and Tanzania, (b) identified issues that push kitchen gardening opportunities at the periphery of the approval procedures and (c) analyzed the process of mainstreaming this practice so as to boost food security and improve sustainable production-consumption patterns. Whereas in developed countries, housing developers have landscaping plans; this is not the case in developing countries. Building standards require land coverage to be 75% for the built structure and 25% for supplementary services. There is an opportunity to exploit the 25% land space for greening the landscape not only for aesthetic purposes but also for food production within and around the built environment. If this approach would be adopted in both the developed and developing world, there is a good opportunity to enhance a certain level of self-reliance in food provision at household level in urban set ups. It is anticipated that the findings in this paper will influence policies on urban food security matters and the review of the Building Codes/Regulations in order to mainstream kitchen gardens for improved cost-effective and environment-friendly urban nutrition.

Key Words: Mainstreaming, Kitchen garden, urban housing approval process, East Africa

EFFECT OF CLIMATE SMART AGRICULTURAL TECHNOLOGIES ON POVERTY LEVEL AMONG SMALL-SCALE FARMERS IN UASIN GISHU

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Abstract

Climate smart agricultural technologies have the potential to reduce poverty in developing countries. These technologies aim to increase agricultural productivity while mitigating the negative impacts of climate change. By improving agricultural productivity, farmers can increase their incomes and reduce their reliance on rain-fed farming. This, in turn, can help to reduce poverty in rural communities. To achieve this, CSA technologies have been put in place increase productivity, increase income and thus poverty reduction. However, despite these interventions, potato production has decline in Uasin Gishu from 21.5 tons per hectare in 2008 to 8.6 tons per hectare 2018, owing largely to climate change effects. The aim of this study was determine the effect of climate smart agricultural technologies on the level of poverty among small scale potato farmers. The study was guided by innovation and diffusion theory. Descriptive research design was employed in this study. A sample of 155 respondents was drawn from a total population of 17,115 small scale potato farmers through a multi stage sampling technique. Data was collected by use of interview schedule and analyzed using the Foster Greer and Thorbecke (2010) measure of poverty. The average poverty incidence among small-scale potato farmers was found to be 41.29% while poverty depth and poverty incidence was found to be 9.75% and 3.65% respectively. Further, the poverty incidence, poverty depth and poverty severity among the CSA adopters were found to be 20.63%, 1.181% and 0.28% respectively, while that of CSA non-adopters were 55.43%, 15.19% and 5.96% respectively. These findings suggest that CSA adoption can have a significant impact on reducing poverty. The poverty incidence, which measures the percentage of the population living below the poverty line, is much lower among CSA adopters compared to non-adopters. Additionally, the poverty depth and severity measures indicate that the poverty experienced by CSA adopters is much less severe than that experienced by non-adopters. This suggests that CSA adoption is not just reducing the number of people living in poverty, but also improving the quality of life for those who are still living in poverty. Overall, these findings highlight the potential of CSA as a poverty reduction strategy, and the importance of promoting its adoption among small scale farmers by providing reliable extension services and making essential services, like, fertilizer and improved seeds markets available for realizing increased agricultural production, farmer income and eventually poverty reduction in Uasin Gishu Kenya.

Key words: Adoption, Climate-smart Agriculture, poverty level, small scale farmer.

INNOVATIVE ARTIFICIAL FISH INCUBATION AND SEX REVERSAL TECHNOLOGY: ENHANCING FISH PRODUCTION, SUSTAINABILITY, AND HORMONE-FREE AQUACULTURE.

Shalefi Abdalla

Fish incubation has traditionally relied on natural methods, such as mouth brooding, limiting the potential for efficient and controlled production. To overcome this limitation, we introduce an innovative artificial fish incubation technology that revolutionizes fish hatchery practices. Our technology utilizes a Recirculatory Aquaculture System (RAS) integrated with automated control systems to maintain optimal environmental conditions during fish incubation. Key factors such as temperature, pH levels, protein concentration in water, and solid waste management are closely monitored and regulated, ensuring ideal conditions for successful egg incubation. Also, we are implementing a novel approach to achieve sex reversal in fish by obtaining super males with YY chromosomes. This eliminates the need for traditional sex reversal programs that involve hormone administration. The YY super males exhibit desirable traits, such as faster growth and improved feed conversion efficiency, leading to enhanced fish production and reduced production costs. By incorporating our innovative artificial incubation and sex reversal technology, we aim to address food insecurity challenges by increasing fish production. The controlled incubation process optimizes egg survival rates and accelerates fish growth, resulting in higher yields. This innovation also presents new job opportunities in the aquaculture sector, contributing to local economic development. Moreover, the hormone-free approach to sex reversal minimizes environmental risks and eliminates potential threats associated with hormone use. This advancement aligns with sustainable aquaculture practices and ensures the production of safe and high-quality fish products, improve sustainability, create employment opportunities, and mitigate environmental risks associated with traditional methods.

Keywords: Artificial fish incubation, Recirculatory Aquaculture System, sex reversal technology, super males, sustainable aquaculture, fish production.

DETERMINANTS OF AGROFORESTRY ADOPTION AND ASSOCIATED BENEFITS AMONG SMALLHOLDER FARMERS OF COASTAL KENYA

Sub-Theme: Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

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Abstract

The agricultural sector is an important segment for the economic growth of developing countries. This sector contributes to about 80% of Kenya's food productivity and smallholder household's livelihood. Smallholder households along Kenya's coastline rely on farming as a major source of food and income. This study examines the drivers and attendant socioeconomic benefits of agroforestry adoption along the Kenyan coast, in Lamu County. We drew our inferences on a survey data from 187 randomly selected households in the study area. Data analyses utilized both descriptive and inferential statistics. A chi-square test was applied to determine the significance of the relationship between the cross tabulated variables. Binary and multinomial logistic regression analyses were used to predict the influence of household socio-economic characteristics on the adoption of different AFPs. A neural network analyses was applied to rank the importance of each predictor variable on adopting AFPs. Results showed that marital status ($p=0.000$), extension services (ESs) ($p=0.002$), and land size ($p=0.004$), significantly and positively influenced the decision of smallholder farmers to adopt agroforestry practices in the study area. It was further observed that majority (60%) households had access to ESs while 40% reported zero access. Results indicated that 6.7% of the non-adopters (20%) of AFPs resided in communal or leased lands. Conversely, 53.3% and 13.3% of the adopters resided on land parcels with and without title deeds, respectively. A neural network statistics further showed that house tenancy (Normalized importance (NI) =99%), education level (NI=99%), land size (NI=93%), employment (NI=90%), and marital status positively influenced the adoption of agroforestry practices. we inferred that policy makers and extension personnel among other stakeholders

ought to consider these factors when championing for expanding agroforestry adoption along the Kenyan coastal smallholder farmers

Key words: Agroforestry adoption; Kenyan coast; smallholder farmers; Neural Network Analyses; principal component analysis

DIVERSITY OF POTATO CYST NEMATODE POPULATIONS IN NYANDARUA, MERU AND NAKURU COUNTIES BASED ON INTERNAL TRANSCRIBED SPACER REGION (ITS) AND SIMPLE SEQUENCE REPEAT MARKERS

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ABSTRACT

Potato cyst nematodes (*Globodera* spp) are common in many of Kenya's potato-growing counties, but little is known about their genetic diversity. The aim of this study was to identify and determine their genetic diversity of potato cyst nematode (PCN) populations present in three potato growing counties namely Nyandarua, Nakuru and Meru in Kenya. Molecular analysis was used to identify the PCN species present from 88 PCN samples collected from the three Counties. Twenty simple sequence repeats markers, four of which were newly designed for this study were used to genotype the 88 PCN samples. The polymerase chain reaction (PCR) amplicons were observed at 434 base pairs amplified with primer (ITS5/PITSr3) specific for *G. rostochiensis* in all the PCN samples. Screening of the 20 SSR markers resulted in identification of four polymorphic markers specific for PCN. The expected heterozygosity (H_e) and Shannon's index (H') ranged from 0.320 to 0.500 and from 0.500 to 0.693, respectively, across the three populations. As a result the H_e and H' values indicate a limited range of genetic diversity and heterozygote deficiency between the samples. The markers' mean polymorphism information content (PIC) ranged from 0.344 to 0.365 indicating an intermediate polymorphism ($PIC \geq 25$) across the populations. Furthermore, analysis of molecular variance (AMOVA) revealed that the highest genetic variance 96% ($P < 0.001$) came from within the population. An Unweighted Pair Group Method with Arithmetic Mean (UPGMA) phylogenetic tree was constructed Based on Nei's genetic dissimilarity and the entire population was grouped into two major clusters and five sub-clusters. Principal coordinate analysis (PCoA) revealed that the variance accounted for by the first three principal coordinates were 27.73, 28.89 and 24.42 respectively. The Bayesian model-based population structure analysis assembled the populations into 6 ($K=6$) distinct genetic structures based on the highest ΔK value ($\Delta K=8.25$). The fixation index (F_{st}) ranged from 0.021 to 0.048, indicating that the three *G. rostochiensis* populations had low genetic differentiation. Overall, the findings demonstrated limited gene flow across the regions.

Key words: *Globodera rostochiensis*, Molecular analysis

SELECTED GROWTH CHARACTERISTICS OF STRIPPED BAMBOO (*BAMBUSA VULGARIS*) VARIETY STRIATA UNDER VEGETATIVE PROPAGATION OF CUTTINGS AND LAYERING

Sub-Theme: Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development.

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Abstract:

Bamboo resources exist in many species, some indigenous to Kenya while other exotic species were introduced in 1980s from China. The species is a fast growing member of grass family and has been put in

many uses. It is regarded a multi-purpose tree species which can substitute timber. Currently, the coverage of the species is low especially in indigenous forests where the government of Kenya has imposed harvesting moratorium on the species. Bamboo seed acquisition is expensive and has low germination rates thus vegetative methods remain most economical and rapid method of raising the species. Although various vegetative propagation methods have been applied on bamboo including direct potting of cuttings and layering knowledge on days taken to produce first shoot, growth rates and number of shoots they can produce per node under environmental conditions is poorly known. This study was done with the following objectives; (1) to establish number of days taken by culms subjected to direct potting and layering to produce first shoot under environmental conditions of the site of study, (2) to determine the growth rates of shoots under direct potting and layering and (3) to determine the number of shoots produced per node when propagated by either direct potting or by layering. Experiments were conducted at Narasha forest station tree nursery located in Baringo County to compare growth by direct cuttings and layered culms. Regeneration of shoots and growth of seedlings were done as described by KEFRI methods. The number of days taken by direct cuttings was shorter compared to layered culms. The growth rates and number of shoots per node were however, higher when layered culms were used as compared to direct cuttings. This study generated important knowledge for propagation of this variety of bamboo.

TOWARDS A REVITALIZED FORESTRY POLICY AND REGULATORY REGIME IN KENYA IN THE LIGHT OF CLIMATE CHANGE: A COMPARATIVE REVIEW

William Rotich Kiprono (University of Kabianga, Directorate of Quality Assurance)

Policy precedes the law. A robust policy framework is imperative to provide a solid foundation for the development and implementation of forestry regulatory and management regime. A review of the past forestry policy framework in Kenya reveals that forest regulatory framework was first developed, and therein the policy framework was derived. This approach is flawed and often presents procedural as well as implementation challenges. The Forestry Act, 2005 is such an example of a regulatory framework developed without a review of the foundational policy structure. The study assesses the draft Forestry Policy, (2014/2020), in the light of the national commitments to the international climate change mitigation framework outlined in the Paris Agreement. A comparative review of the policy framework is made to ascertain its consistence to the emerging trends in the forestry policy design globally, and more particularly the Food and Agricultural Organization (FAO) guidelines on development of forestry policy. The extent to which the draft forestry policy is aligned to the environmental, land, water, and Agricultural policy and regulatory regimes is examined.

Key Words: Climate Change, Carrying Capacity, Ecological Resilience, precautionary Principle, and Polluter- Pays Principle and Sustainable Development.

THE ROLE OF UNIVERSITIES IN NATURAL RESOURCE CONSERVATION AND SUSTAINABLE DEVELOPMENT

SUB-THEME:

Innovation and Practices in Agriculture, Food Security and Natural Resources Conservation for Sustainable Development

BY

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ABSTRACT

The ballooning population and changing lifestyles has put pressure on the natural resources which if not conserved will endanger sustainable development. Natural resource conservation and sustainable development are not only becoming increasingly important issues globally, but also are becoming 'Siamese twins' since their existence is dependent on one another with only natural resources becoming more provident to sustainable development. The existence of the universities therefore is well placed to take center stage to propel the achievement of both natural resource conservation and sustainable development. The main objective of this paper is to investigate the role that universities play in natural resource conservation and sustainable development. This paper sets two objectives: first being to identify the key roles of the universities in natural resource conservation for sustainable development; and second is

to evaluate the effectiveness of roles of the universities in natural resource conservation in sustainable development. This paper will use the existing literature from scholarly work and also from the research reports of reputable organizations and government institutions to achieve its objectives. The paper will eventually provide the identified roles of universities in natural resources conservation and their effectiveness in enhancing sustainable development. The paper will also provide recommendations on the various roles that the universities can explore in order to conserve the natural resources and enhance sustainable development.

KEY WORDS: natural resources, sustainable development, conservation

COVID-19, RISK MANAGEMENT AND SUSTAINABLE DEVELOPMENT: AN EMPIRICAL REVIEW OF THEORIES
Sub- Theme: Innovation Approaches In Economics And Business Practices For Sustainable Development

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ABSTRACT

Organizations have experienced several challenges during the Covid-19 Pandemic. With increased exposure to specific risks, the concern is about the organizations' resilience to counter the Pandemic's adverse effects. Companies in the world faced risk management issues that nearly destroyed the operations of the firms. This paper seeks to examine the risk management practices during the Pandemic by evaluating the impact on risk management and sustainable development. The paper employs theoretical review and Empirical Review. The study is anchored on Resource-Based Theory, Agency theory, Stakeholder Theory and Financial Theory. The reviews on empirical and theoretical literature sought to determine the impact of the Pandemic on risk management. The study found out that the companies are significantly impacted by specific risks, including market risk, operational risk, credit risk, and liquidity risk. In the conclusion, the study indicated that most organizations encountered challenges due to specific risks since they were not prepared to deal with the Pandemic. The study may assist the government and industry players with formulation of policy on risk management strategies that will cushion organizations should pandemics occur. The results may also assist managers in formulating superior policies and strategies on strong and effective risk management beyond the obvious occurrences and continuous review of existing risk management policies and strategies and by using the findings to improve organizations performance by working on the risks in banks. The study includes recommendations for further studies on this area and the effectiveness of risk management approaches during the Pandemic.

Key words: Covid-19, Risk Management, Sustainable Development, Resource-Based Theory, Agency theory, Stakeholder Theory and Financial Theory, Empirical review.

**INNOVATIVE E-HUMAN RESOURCE MANAGEMENT PRACTICES AND ORGANIZATION PERFORMANCE IN
COMMERCIAL BANKS IN NAKURU COUNTY**

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Organizations across the globe are now operating in a dynamic environment with stiff competition which calls for improved performance for survival and continuity. This study purposed to examine the relationship between eHRM and organizational performance. The specific objectives were to; establish the relationship between e-Training, e-Recruitment, e-Performance Appraisal and organizational performance in selected commercial banks in Nakuru City which have adopted eHRM. The study was guided by two theories; Systems and Resource Based View theories. Comparative research design was adopted. It was conducted in three (3) selected banks in Nakuru City in Nakuru County; the target population was one hundred and five (105). Census method was used which was considered suitable for a small population. A self-administered questionnaire was adopted to collect primary data. The validity of the instrument was enhanced through professional expert opinion while reliability was achieved using Cronbach Alpha coefficient where all items scored above 0.70. Inferential and descriptive statistics with the aid of SPSS software was used to analyze data. The hypotheses of the study were tested at 0.05 significance level. Charts, tables and graphs were used in presenting the results. The findings indicated that the variables under study; recruitment, training and performance appraisal, had a negative significant correlation with organizational performance before eHRM ($\beta=-0.361$, $p=0.000<0.05$, $\beta=-0.389$, $p=0.000<0.05$ and $\beta=-0.562$, $p=0.000<0.05$ respectively) whereas after eHRM, e-recruitment, e-training and e-performance appraisal had a positive correlation ($\beta=0.907$, $p=0.000<0.05$, $\beta=0.814$, $p=0.000<0.05$ and $\beta=0.259$, $p=0.009<0.05$ respectively). Use of eHRM in organizations was recommended as a worthwhile undertaking that has positive returns on investment. Organizations should design and implement eHRM systems for more efficiency and effectiveness in their HR activities. The findings are expected to benefit both financial and non-financial institutions, policy makers and the government. The findings may also add to the available literature.

Key Words

e-Human resource management, Organizational performance, e-Training, e-Recruitment, e-Performance Appraisal

TALENT ATTRACTION PRACTICE, ORGANIZATION CULTURE AND SUSTAINABLE ORGANIZATIONAL PERFORMANCE IN CHARTERED UNIVERSITIES IN KENYA

SUB-THEME Business practices for Sustainable Development

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ABSTRACT

Universities contribute greatly to economic development of a country. However, Universities experience scarcity of academic staff due to tremendous increase in student enrolment yet little attention is given to attraction and retention of staff for sustainable performance. This study determined the relationship between talent attraction practice (TAP), organization culture (OC) and sustainable organizational performance (SOP) in Chartered Universities in Kenya. Maslow Hierarchy of Needs theory guided the study. Correlational and retrospective longitudinal designs were adopted. Target population constituted 51 Registrars purposively selected from 51 Chartered Universities as at 2020. Primary and secondary data was collected using questionnaires and document review guide respectively. Pilot study was conducted on 5 Universities and reliability confirmed by Cronbach Alpha coefficient 0.874. Relevant approvals were

obtained before data collection. Data was analyzed descriptively and inferentially. Descriptive statistics revealed TAP (Mean=4.0293, Standard Deviation=0.76139). Inferential statistics revealed that talent attraction practice had statistically significant relationship with sustainable organizational performance; TAP ($R=0.751$; $R^2=0.564$; $\beta=0.404$ and $p=0.000$). The R value 0.751 indicated a strong positive correlation, $R^2=0.564$ implied that 56.4% of variation in SOP was explained by TAP and the remaining 43.6% was attributed to other factors outside the model. The model was significant ($F=56.861$, $p=0.000$). Organization culture had a statistically significant moderating influence; $\text{Int.}(TAP*OC)=[R=0.869$; $R^2=0.755$, $R^2\Delta=0.191$; $\beta=0.162$; $F=43.172$ and $p=0.001$). The $R^2\Delta=0.191$ implied 19.1% variation in SOP was explained by interaction between TAP and OC hence conclusion that moderator strengthens the relationship between TAP and SOP. The study concluded that TAP is a contributor to SOP under positive organization culture. The study recommends conscious creation of supportive institutional culture to support implementation of TAP to ensure SOP. This study informs policy formulation on TAP and its contribution towards sustainable performance in Chartered Universities Kenya and the influence of organization culture on the relationship between the variables.

Key words: Talent Attraction Practice, Organization Culture, Sustainable Organizational Performance, Chartered Universities

TRANSFORMING THE BOTTOM LINE: HOW ARTIFICIAL INTELLIGENCE IS RESHAPING THE FUTURE OF ACCOUNTING AND FINANCE

Innovation Approaches In Economics And Business Practices For Sustainable Development

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ABSTRACT:

Of recent, artificial intelligence (AI) is rapidly transforming various industries, and the accounting and financial investments professions are no exception. The integration of AI technologies in these professions is revolutionizing the way financial data is processed, analyzed, and interpreted. These technologies are replacing paper work and pencils with more advanced use of computers and software programs that help to decrease the amount of time spend on repetitive assignments carried by practitioners in this field. Guided by the customer relationship management theory, Christensen's disruptions theory and using a multi-scenario document analysis, this paper analyzes the literature and examines the emerging shift in the practice of accounting and investments. An integrative review methodology was used to identify emerging constructs relating to accounting and investments practice in the modern corporate sector. The integrative review revealed that innovative advancement of AI technologies are enhancing big data analytics, accuracy, efficiency and transparency in the accounting and investments profession. In addition, the integration of machine learning into accounting processes through algorithms not only revolutionize traditional accounting and investments functions by data automation, fraud detection, risk assessment, financial forecasting and reporting, client engagement, but also identify functional anomalies. Accountants and investments experts are able to focus on value-added tasks, achieve improved accessibility, real-time data updates, and enhanced collaboration. This enables firms to streamline their financial operations, automate repetitive tasks, and focus on strategic decision-making processes. Furthermore, data analytics and predictive modeling can empower these professionals to extract valuable insights from large volumes of data, enabling proactive corporate decision-making. By embracing AI, these

professionals can optimize their workflows, enhance decision-making capabilities, and provide more value-added services to their clients. The paper concludes that accountants and investments professionals have to upskill, adapt to new technologies, and become strategic advisors in such evolving business landscape. On their part, firms have to navigate the evolving accounting and finance landscapes thereby unlock new opportunities for growth.

KEY WORDS: Artificial Intelligence; Data Automation, Data Accuracy; Automated Wealth Management

OBJECTIVE QUALITY AND PRICE VARIATION IN TEA MARKETING: A CASE OF KENYA TEA DEVELOPMENT AGENCY FACTORIES IN WEST AND EAST OF RIFT VALLEY, KENYA.

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Abstract

Tea sector is an important part of Kenya's economy as a leading export earner. Kenya Tea Development Agency (KTDA) farmers' earnings in bonus payment fluctuate based on variation in tea prices, however farmers in the West of rift valley under KTDA factories are paid less as compared with East. The paper seeks to establish relationship between objective quality and price variation in tea auction. The study was anchored on quality dimensions' framework. The study employed correlational research design. Purposive sampling procedure was used to collect secondary and primary data. Sample size 399 study cases from 7 tea factories with a population of 21,840 cases. Data extraction tool was used to collect data from secondary sources while primary data was obtained using questionnaires. Collected data was analysed using Microsoft Excel, SPSS as well as STATA, descriptive statistics were used to summarize data. The hypothesis of the study was examined using simple linear regression model based on the panel data collected. The findings reveal that there is significant difference in objective quality of tea from East and West region ($P < 0.05$) with quality of tea from KTDA factories East better than KTDA factories in West of rift valley. The study also found that objective quality had significant relationship with auction price of tea. The study concluded that objective quality had significant relationship with price variation, however, supply had negative moderating effect on this relationship. The study recommended that KTDA factories and small scale farmers from West should bench mark with KTDA East of rift valley factories and farmers to improve quality of their tea.

Keyword: Objective Quality, Price Variation, Correlational research design, Kenya Tea Development Agency (KTDA), Kenya

RELATIONSHIP BETWEEN JOB CHARACTERISTICS AND EMPLOYEE COMMITMENT IN STAR RATED HOTELS IN KISUMU CITY, KENYA

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ABSTRACT

Employee commitment is one of the critical problems faced by the organizations today. The outcomes related to employee commitment can be resolved through enriched jobs. There is limited knowledge both from practice and academic aspects, regarding the effect of job characteristics on employee commitment. As a result of this perspective, this study examined the effect of job characteristics and commitment in star rated hotels in Kisumu City, Kenya. The study was anchored on Job Characteristics Theory and Three-Component Model of Commitment. The study adopted sequential explanatory research design. The target population was 1372 employees and 130 management employees from 34 star rated hotels. The sample size comprised of 310 subordinate and 13 management employees. Stratified random sampling technique was used to select subordinate employees, while purposive sampling was used to identify management employees. Questionnaires and an interview schedule were used to collect data. Quantitative data was analyzed using linear regression and qualitative data analyzed using content analysis. The findings showed that Job characteristics influenced 22% ($R^2=0.220$) of the employee commitment. There was a positive significant relationship between Job characteristics and employee commitment ($\beta_4=0.583$ and $p<0.05$). The study concluded that job characteristics have a significant relationship with employee commitment in star rated hotels in Kisumu City. The study recommends that hotel management should bring changes in the job by combining multiple tasks to produce a whole task to achieve positive work outcomes. The management of hotels should focus on creating jobs with high task significance, as the nature of work demanded more interdependencies among the employees. Giving employees more authority and responsibility across organizational levels can positively influence their commitment.

Key words: *Job Characteristics, Employee, Commitment, Star Rated Hotels*

LOAN LENDING MECHANISMS AND GROWTH OF WOMEN ENTERPRISES FUNDED BY KENYA WOMEN FINANCE TRUST IN KERICHO COUNTY

Sub theme: Business (Entrepreneurship)

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ABSTRACT

Women in urban and rural obtain credit services through group formation rather than individual because of the challenges they face, such as lack of collateral. Previous studies have demonstrated that women may access financial credit from micro-finance institutions though a corresponding growth in women's enterprises remains unknown. Dynamic competitive business environment have therefore made most of microfinance institutions innovative and have designed products to fit various customers. Competition from commercial banks have led to new products offered by micro-finance institutions which facilitate provision of credit facilities to the needy groups in society. These products include group-based lending, progressive credit advancement, group monitoring and collateral-free lending systems. The study sought to establish the relationship between loan lending mechanisms and growth of women enterprises funded by Kenya Women Finance Trust in Kericho County. It specifically established the relationship between individual, progressive and collateral free lending mechanisms and growth of women enterprises funded by Kenya Women Finance Trust in Kericho County. This study was underpinned on the theory of credit access. The study adopted a correlation research design with a target population of 636 members from 70 women enterprises in Kericho County. Yamane's formula was applied and a simple random sampling technique was used to pick a sample size of 245. Primary data was collected using questionnaires and interview schedules, while secondary data was collected from document analysis. Validity was determined through piloting, where the researcher compared the actual outcome against predicted responses, and

reliability was determined by using Cronbach's alpha to examine the reliability, where a coefficient value of 0.83 was obtained and deemed reliable. Data collected was coded into a statistical package for social statistics and analyzed through descriptive and inferential statistics. Data was presented in the form of frequency tables. The findings from the study revealed that there was no significant relationship between the loan lending mechanisms and the growth of women's enterprises ($r = 0.035$, $P = 0.604 > 0.05$). These study findings will be beneficial to business and women entrepreneurs, financial institutions in policymaking, government agencies and future researchers and academicians. The findings will guide in utilization of proper ways to avail credit facilities to customers in order to ensure growth in asset base, branch expansion, number of employees, number of customers and sales growth for business survival. The study concluded that though group lending was most adopted than individual lending it had no significant influence on the growth of women enterprises. Therefore, the study recommended that KWFT should train and mentor its customers on running of enterprises. The study also recommended that KWFT develop more products to attract and encourage women enterprises to access credit facilities from the institution.

Keywords: Loan lending mechanisms, individual lending, progressive lending and collateral free lending, growth of Women Enterprises.

IMPACT OF FINANCIAL TECHNOLOGY TO THE BANKING SECTOR

Sub-Theme: Innovation Approaches in Economics and Business Practices for Sustainable Development

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ABSTRACT

Startups in the fintech sector, which offers financial services based on technology, represent a major revolution in the sector. In order to innovate and facilitate, these newly established corporate organizations use digital technology like computers, the internet, mobile devices, and data, which puts them in intense rivalry with traditional incumbents like banks. In order to compete with these new rivals, banks are developing a number of different methods, one of which is acquisition. Prior research suggests that bank mergers and acquisitions and fintech have a considerable favorable influence on the operating efficiency, liquidity, and financial leverage of banks but have a detrimental long-term effect on their stock market performance. This report provides direction for financial institutions, decision-makers, and regulators when developing strategies for new market competitors. This article is a secondary research based on a review of existing knowledge mainly from journals in the areas of financial technology and Banking. The study aims to examine their development and expansion, impact on the banking industry's structure, and current and potential competitors' business strategies. It is also aimed at reviewing the increasing body of theoretical and empirical studies that have endeavored to examine the range of magnitude and effects of the fintech sector on the performance of Banks. It is anticipated that a detailed conceptual framework will be developed to guide future research. The findings of the study will provide valuable insights to financial markets stakeholders on how to strategically position themselves to benefit from massive technological changes in future.

Key Words: Financial technology, Financial markets, financial performance, Leverage.

COVID-19, RISK MANAGEMENT AND SUSTAINABLE DEVELOPMENT: AN EMPIRICAL REVIEW OF THEORIES

Sub- Theme: Innovation Approaches in Economics and Business Practices for Sustainable Development

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ABSTRACT

Organizations have experienced several challenges during the Covid-19 Pandemic. With increased exposure to specific risks, the concern is about the organizations' resilience to counter the Pandemic's

adverse effects. Companies in the world faced risk management issues that nearly destroyed the operations of the firms. This paper seeks to examine the risk management practices during the Pandemic by evaluating the impact on risk management and sustainable development. The paper employs theoretical review and Empirical Review. The study is anchored on Resource-Based Theory, Agency theory, Stakeholder Theory and Financial Theory. The reviews on empirical and theoretical literature sought to determine the impact of the Pandemic on risk management. The study found out that the companies are significantly impacted by specific risks, including market risk, operational risk, credit risk, and liquidity risk. In the conclusion, the study indicated that most organizations encountered challenges due to specific risks since they were not prepared to deal with the Pandemic. The study may assist the government and industry players with formulation of policy on risk management strategies that will cushion organizations should pandemics occur. The results may also assist managers in formulating superior policies and strategies on strong and effective risk management beyond the obvious occurrences and continuous review of existing risk management policies and strategies and by using the findings to improve organizations performance by working on the risks in banks. The study includes recommendations for further studies on this area and the effectiveness of risk management approaches during the Pandemic.

Key words: Covid-19, Risk Management, Sustainable Development, Resource-Based Theory, Agency theory, Stakeholder Theory and Financial Theory, Empirical review.

MODERATING EFFECT OF EMPLOYEE TRAINING ON THE RELATIONSHIP BETWEEN ISO CERTIFICATION AND ENROLMENT OF STUDENTS IN PUBLIC UNIVERSITIES IN KENYA

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Abstract

Internationalization of higher education institutions has brought the need to ensure the quality of higher education systems. Public universities are expected to acquire International Standard Organization (ISO) 9001 certification as a condition for working together towards process improvement. Employee training enhances employees learning, abilities and skills to perform well to help higher learning institutions accomplish its targets. The study therefore sought to determine the moderating effect of employee training on the relationship between ISO certification and enrolment of students in public universities in Kenya. Explanatory research design was used in the study. The research targeted a population of 433 respondents from which a sample size of 205 respondents was selected using purposive and simple random sampling designs. A questionnaire was used to collect data. A multiple regression analysis was performed. From the regression model the ISO certification explained 47.1% ($R^2 = 0.471$); with moderator, employee training explaining 64.9% ($R^2 = 0.649$), an additional R^2 of .178 (17.8%). The interaction between ISO certification and employee training (ISO*Train) explained 66.4% ($R^2 = 0.664$) of the variance on enrolment of self-sponsored students, resulting on R^2 change of 0.015 (1.5%). There was a positive significant relationship between ISO 9001 certification ($\beta_1=0.758$ and $p < 0.05$) and employee training ($\beta_2= .843$, $P < 0.05$) on enrolment level of self-sponsored students. The interaction between ISO certification and employee training ($\beta = .139$, $t = 2.844$, $P < 0.05$) on enrolment level was significant. This confirmed that employee training moderates the relationship between ISO certification and enrolment level of self-sponsored students. The study concludes that employee training moderates the relationship between ISO certification and enrolment level of self-sponsored students. Employee training positively influenced enrolment level of self-sponsored students. There was need for management of the public universities to ensure that the admissions of self-sponsored students are provided within the service charter timelines. The Kenyan public universities management should ensure that there are clear and well-established enrolment and admission guidelines and all training programmes should be duly approved by accredited government authority. There was need for management of the public universities to provide training to its employees.

Key words: ISO 9001 certification, Enrolment level, Employee Training, Self-Sponsored Students, Public Universities

PRODUCTIVITY ASSESSMENT OF HOSPITALITY MANAGEMENT GRADUATES IN UASIN GISHU COUNTY

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Abstract

Hospitality industry is a growing sector that accounts for a good share in the national GDP. To make this sector more productive, Hotel and Hospitality Management program tasks itself in producing highly trained professionals in all aspects of hospitality by emphasizing on a student centered learning approach through practical training. This study assesses the productivity of Hotel and Hospitality Management graduates in Uasin Gishu County. It examines the practical programs undertaken by these graduates, their relevance at the workplace, and the challenges encountered. Therefore, the purpose of this study was to assess productivity Assessment of Hospitality Management Graduates in Uasin Gishu County. The study adopted human capital theory and employed a mixed research method and cross-sectional survey research design. University graduates working in three and five star hotels in Uasin Gishu County were the target population for the study. Simple random sampling and purposive sampling were used in selecting respondents for this study. Data analysis involved both quantitative and qualitative analysis through descriptive analysis and inferential analysis. Questionnaires, interview guides for structured and unstructured interviews were used to collect data. The study adopted Cronbach's alpha technique to test for reliability of the instruments to be used. Data was analyzed as per the research question where both descriptive analysis and inferential analysis were used. The study hopes through its findings to propose a recommendation for adoption that will improve productivity in hotel and hospitality industry for socio-economic development of the country.

INFLUENCE OF ENTREPRENEURSHIP ON SOCIO-ECONOMIC EMPOWERMENT IN REGISTERED YOUTH GROUPS IN KENYA: A CASE OF MAKADARA SUB-COUNTY, KENYA

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Sub Theme: 8 (Cross-cutting issues)

ABSTRACT

The Youth bulge has presented challenges both to nations and the youth themselves. As a result, countries have developed or updated national policies and programs to promote the socio-economic empowerment of youth. This study considers youth groups as social organizations that are created to help young people participate in development and cope with social and economic challenges. The main objective of this study was to determine the influence of Entrepreneurship on socio-economic empowerment in registered youth groups in Nairobi, Kenya with a key focus on Makadara Sub-County. The study was grounded on the Human Capability approach. The study adopted a descriptive survey design. The stratified sampling techniques were used and Slovin's formula was applied to obtain the required sample size. A structured questionnaire was used to collect data. The findings show a strong and positive relationship between entrepreneurship and socio-economic empowerment of youth in registered youth groups in Makadara sub-county, Nairobi County. The study showed that youth in registered youth groups (sample size of 184) in Makadara sub-county Nairobi County have embraced technology and used their social networks and social media to positively influence socio-economic empowerment. Youth groups are not only seen as a platform for meeting with friends but as a place for the opportunity to market products, explore new ideas, and combine resources to undertake development activities. The findings- show that youth between 21-29 years age bracket make up the majority of the membership at 47.6%, then followed by those between 30-35 years at 27.2%, 21-24 years at 22.4% and only a 2.7% for those between 18-20 years, of this study are intended to inform decision-makers to streamline their interventions and act with confidence on the factors that will improve the activities and outcomes within youth groups as youth people continue to be at the center of community development.

Keywords: Youth, Socio-economic empowerment, Entrepreneurship, Youth Groups, Makadara sub-County, Nairobi County.

RELATIONSHIP BETWEEN SEMINARS AND EMPLOYEE PERFORMANCE IN LEVEL FOUR HOSPITALS IN SOUTH-RIFT REGION, KENYA

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ABSTRACT

Health sector is an area of priority for efficient delivery of services. Health policies have been developed and adopted to enhance accessible and quality health care. Poor service delivery have been attributed to employee performance. Unmatched skills set to job requirements are assumed to have a significant impact on the performance of employees. The effectiveness of employee training and development programs such as seminars can bridge the gap between job requirements and employees ability to perform. However, it is not yet clear to what extent seminar activities influence employee performance. Therefore, the study sought to assess the relationship between seminars and employee performance in Level Four Hospitals operating within the South-Rift Region in Kenya. Specifically it established the relationship between structured seminars, work environment based seminars and performance feedback based seminars and employee performance in Level Four Hospitals in South-Rift Region in Kenya. Human capital theory, knowledge-based theory of the firm and social learning theory were used. Correlational and survey research designs were employed with a target population of 663 and a sample of 249. Stratified simple random sampling was used to pick the respondents. Data was collected using structured questionnaire and reliability Cronbach alpha coefficient of 0.7625 obtained. Descriptive statistics mean and standard deviation were used in data analysis while the study hypothesis was tested using correlation coefficient. The findings were presented in tables. The findings indicated that seminars had a positive and significant relationship with employee performance at Level Four Hospital in the South-Rift region where ($R = 0.570$, $\beta_1 = 0.483$, $R^2 = 0.325$, $p < 0.05$) was established. The study recommended that Level Four Hospitals in the South-Rift region adopt seminar activities that will help improve the efficiency of the training techniques. The findings may be useful to hospital management, human resource departments, scholars, and researchers in human resources management.

Key words ; Employee performance, performance feedback, work environment based seminars, structured seminars

RISK TAKING, INNOVATIVENESS AND FAMILY OWNED FIRM PERFORMANCE. THE MEDIATING ROLE OF FAMILY FIRM GOVERNANCE.

SUB-THEME: Innovative Approaches in Economics, Business Practices for Sustainable Development

AUTHORS: Soi Hazel Chebet

ABSTRACT

Family owned firms are all over the world, some researchers estimates up to 12 million family firms in the united states of America. While researchers of family owned firms tend to show that some of the family owned firms perform well others does not because of the firm's inability to form a strong internal environment to deal with the stiff competition from other firms. Despite the role played by family owned firms in building the economy ,they are faced with many challenges that lead to poor performance and even others end up closing down within their first five years of operation. This is due to lack of skills in

management, insufficient resources and stiff competition. Many firms have wound up their activities while others are experiencing low profitability or low return on capital due to the stiff competition, and this shows that the owners and employees may be lacking entrepreneurial orientation. Also, from the reports in the counties integrated development plans there is up to 20 percent of unemployment and yet family-owned firms are said to offer job opportunities. The aim of this study is to analyze the mediating effect of family firm governance in the relationship between risk taking, innovativeness and the performance of family owned medium firms. The objectives of the study is to find out the influence of risk taking on family owned firms and to find out the influence of innovativeness on family owned firms in Nakuru and Mombasa counties. Based on a self administered questionnaire, data is collected from 216 respondents/owners of the family owned medium firms in Nakuru and Mombasa counties. The data collected were analyzed using SPSS version 23.0 and multiple regression analysis was done. The findings shows that family firm governance affects the entrepreneurial orientation features which influence the performance of the said firms' performance. The study shows that the owners and other stakeholders should emphasis on the development of a strong family firm governance as it may contribute to better response to the changing customer needs and also enhance the performance of the firm.

KEY WORDS;

Entrepreneurial orientation, Risk taking, Innovativeness, Family firm governance and Profitability

EFFECT OF INTEGRATED FINANCIAL MANAGEMENT INFORMATION BUDGETING SYSTEM ON FINANCIAL MANAGEMENT IN COUNTY GOVERNMENTS, KENYA

Sub Theme: Innovative Approaches in Economics, Business Practices for Sustainable Development

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ABSTRACT

The Kenyan management of public funds still faces a variety of issues that are not in accordance with the principles of public finance, despite the fact that over the past years, many legal and institutional frameworks for Public Finance Management (PFM) have been implemented. The purpose of the research was to determine whether the implementation of the IFMIS financial budgeting system improved the financial management of county governments. The objective is to examine the effect of IFMIS Budgeting system on financial Performance of county governments. The descriptive survey design and the causal research methodology were used. The target population consisted of 302 staff in the Treasury Department in the county governments of Kakamega, Busia, Vihiga, and Bungoma. This included 44 procurement officers, 46 internal auditors, 89 accountants, 87 finance officers, and 42 revenue officers. The selection of the 172 respondents was accomplished via the use of a method known as stratified random sampling. The questionnaire method was used to acquire the primary data. Pilot research was done to assess the content and construct validity, and Cronbach Alpha was used to determine the dependability of the information. Using descriptive and inferential statistics, an analysis of the quantitative data was carried out. The threshold of significance used in the testing of hypotheses was 0.05. The information was laid up in tables, and several models were developed. The investigation's findings indicated that the IFMIS financial budgeting system substantially accounted for 36.3% of the difference in financial management across the County Governments in Western Kenya ($R^2 = 0.363$, $P = 0.000$). The IFMIS financial budgeting system had a significance level of $P=0.05$, and the unstandardized regression coefficient value was 0.742. This suggested that a change of one unit in the IFMIS financial budgeting system would result in a change of 0.742 units in the financial management of county governments in Western Kenya. The study concluded that IFMIS financial budgeting system had a major impact on the financial management of Kenya's county governments, thus researchers concluded that the null hypothesis should not be accepted. The research suggests that county government should adhere to the requirements of financial budgeting policies and

should consider linking electronic budgeting with modules of other units to enhance monitoring and assessment of budget expenditures

Keywords: IFMIS, Budgeting System, Financial Management, County Governments, Western Kenya

SMALL STATE RESILIENCE IN GLOBAL POWER AND THE INFLUENCE OF FOREIGN POLICY

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A Presentation to the 3rd University of Kabianga International Multidisciplinary Conference, 27th to 29th Sep. 2023;

Conference Theme: *Innovation and Practices for Research and Sustainable Development Goals (SDGs) in the 21st Century*

Sub – Theme: *Education, Gender, Security and Inter-State Innovation and Practices for SDGs*

Abstract

In seeking to project relevant and related solutions as far as small state resilience is concerned in global power arena, this article underscores that existing scholarship has delved much in; small state resilience to disaster due to their capacity vulnerability, interpretation of resilience as a process of structural securitization, and very beneficially in application, a view of State resilience can gain an assertive conjecture as used by Morgan, Fletcher, and Sarkar (2013) that team resilience identifies the resilient characteristics of elite sport teams defined as a dynamic, psychosocial process which protects a group of individuals from the potential negative effect of the stressors they collectively encounter. Team resilience comprises of processes whereby team members use their individual and combined resources to positively adapt when experiencing adversity. Whereas the first two arguments also fit into the wider conceptual web of this article, the latter application suits the illustrative interest of the authorship by depicting Small states as active players as opposed to being vulnerable organisms and entities whose actions are outcomes of a definite unchanging global structure. The study will be achieved by examining team resilience of small states in global power and the influence of foreign policy, assessing the structural adaptation of small states in global diplomacy, and finally theorizing the small state influence of foreign policy in global power as an attribute of capacity theory. Conclusively, Ish-Shalom (2009) posits that theories are tumultuous and conceived in the serenity of academy, they are, at times, forced into the real world, where upheavals of political issues dominate, as a social responsibility even though theorists do not bear moral responsibilities for their theories ramifications. Small States resilience on the basis of capacity theory may seem helpless but with different strands of the theory as a multifaceted concept they influence foreign policy strategically in global power structure.

Keywords: Small States, Small States Resilience, Global Power, Foreign Policy, Structural Securitization, Capacity Theory, Global Diplomacy, North-South Politics, etc

CULTURAL DIPLOMACY AND ECONOMIC INTERESTS BETWEEN KENYA AND UGANDA

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ABSTRACT

The practice of cultural diplomacy has been in existence since time in memorial, with the purpose of maintaining and promoting good relations between and among countries. Indeed, today, in the post-Cold War global dispensation, governments around the world are driving efforts into resource mobilization to influence foreign policy via cultural diplomacy since foreign policy is the externalization of national policy. Cultural diplomacy, it is contended, involves the exchange of ideas, information, art, sports and other cultural components like music, dance and drama among others, between and among countries and peoples, in order to promote mutual understanding rather than use of force (hard power), violence or money to subjugate people of different nationalities across international borders. This paper used Soft Power Theory as its theoretical framework on cultural diplomacy and assessed its contribution to economic interests between Kenya and Uganda. Methodologically, the paper is based on document analysis and

interaction with some key respondents through Key Information Interviews (KIIs), which aided in presenting and discussing the results that led to the conclusions that emphasize the vitality of cultural diplomacy in enhancing bilateral economic relations.

THE EDUCATION FUNCTIONS OF TRADITIONAL HEALERS' STREET ADVERTISEMENT REGISTERS OF ELDORET, KENYA

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Abstract

This study has interest on the educational functions embedded within the street advertisements registers of traditional healers in Eldoret, Kenya. Traditional healing advertisement registers play a significant role in the sharpening economic knowledge of people in the community, serving as reminder of the real economic situation globally and national wide. The traditional healers have in the past employed the word of mouth in the passage of traditional solutions. However, with modernization, they have adopted electronic and print media that has superseded the word of mouth as a source of education. In Kenyan towns and villages, certain strategic street pathways are stuffed with Traditional Medicine advertisements by herbalists and witchdoctors. The street advertisement registers of TH, which are visually striking and culturally significant, have rarely been studied for their potential role in education. The effects of using advertising to promote trade in emerging societies remain a major topic as a means of fostering social modernization. This qualitative study employs a multidisciplinary approach, drawing from linguistics, education, and cultural studies, to investigate the hidden educational aspects of THR's, ads. Data was collected through photography, interviews and observations with local community members. Additionally, content analyses of the registers and participants observation were utilized to gain insights into their educational functions. The findings reveal that these street advertisement registers serve as a rich source of knowledge on economics, medical and social education, within the community. Traditional healers use the registers to educate their target clients, creative economic practices, natural healing, medicinal herbs, and cultural traditions. The registers function as warehouse of community history, transmitting cultural values, and preserving indigenous knowledge. The study sheds light on the importance of recognizing the role of discourse of traditional healers' ads as an eye opener of promoting a solution based educational system, good health practices and preservation of the Kenyan cultural heritage. Further the County governments could use the street ads to discover challenges of their communities and lay down strategies to address them. Understanding the educational functions of traditional healers' street advertisement registers can contribute to a more inclusive and culturally sensitive approach to education, economic and healthcare in Eldoret, Kenya, and similar contexts.

Keywords: Advertisements registers, traditional healers, discourse, economic educational functions, relevance

INVENTION AND INNOVATION IMPASSES AGAINST SUSTAINABLE DEVELOPMENT GOALS

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Abstract

This paper will analyze cross linguistic dilemma affecting communication and adoption of Sustainable Development Goals. It will discuss the relevance, motivation and existing invention and innovation schemes in sampled higher learning institutions in Kenya. It will look into impasses relating communication of SDG related research findings. It will apply Critical Discourse Analysis method in assessing the missing SDG inclining strategies in university curriculum that ought to promote inventions and innovation even as Kenya move towards full implementation of competence based education. It will discuss how invention and innovation motivation strategies could be used to promote achievement of SDGs. It will also look into the role of Incubation approach in building a multidisciplinary and cross national approach in attaining SDGs targets. It will consider how research commercialization may advance or worst still exacerbate the world's attempts to achieve SDGs.

REALIGNING POLITICAL LEADERSHIP TO THE ADVANCEMENT OF ROAD INFRASTRUCTURE FOR SUSTAINABLE DEVELOPMENT IN NAROK NORTH SUB-COUNTY, KENYA

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Sub-theme: (Education, Gender, Security and Inter-state innovation and practices for SDGs)

Abstract

Road Infrastructure development has become one of the pertinent concerns of the modern governments. Kenya has in the recent past been highlighted as one of the countries with decent and technologically-sophisticated road infrastructure in the continent. Despite this milestone, little is known about the place of political leadership in determining the development of road infrastructure in the country. Thus, in an effort to understand the development and sustainability of road infrastructure, this research paper sought to investigate the influence of realigning political leadership to the development of road infrastructure in fostering sustainable development. Purposive sampling method was used to select the participants to the study. A sample of 48 public administrators poised at the forefront of implementing road infrastructure development projects and 96 mature citizens within the 48 administrative units in Narok North Sub-County participated in the study. Interviews were conducted with the public administrators and questionnaires administered to the citizens respectively. Thematic analysis as well as quantitative analysis were carried out to analyze the data. The study established that political leaders are instrumental when it comes to the mobilization of resources at the county and national levels and identification of the imperative needs of the citizens including road infrastructure. The findings of the study further revealed that 71.74% of the respondents asserted that realigning political leadership to the advancement of road infrastructure development would culminate into realization of sustainable development. The study recommended that voter sensitization should be undertaken to boost political consciousness of the citizens so that they become enlightened on the choice of the right leaders because political leaders are instrumental in determining the development of infrastructure projects and realization of the SDGs in the nation.

Key Words: Advancement, Political leadership, Public administrators, Road infrastructure, Sustainable development

INTERPERSONAL COMMUNICATION BARRIERS TO THE UPTAKE OF CERVICAL CANCER SCREENING IN UASIN GISHU, KENYA (5).

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Despite being preventable, cervical cancer remains a major health threat to women, pointing to little success in terms of screening uptake. Without immediate action, the number of deaths from cervical cancer will continue to increase since majority of the women turn to hospitals with late-stage disease. This study sought to establish interpersonal communication barriers to the uptake of cervical cancer screening in Uasin Gishu, Kenya. The study used systematic random sampling method to obtain a sample of 308 respondents from the population who were issued with close-ended questionnaires. Purposive sampling was used for the key informants, namely 4 health workers and 2 County officers from the Ministry of Health. Two focused group discussions (FGDs) each having 10 women were also conducted. The FGDs and key informant interviews were used to generate qualitative data which was analyzed using thematic content analysis with the aid of Nvivo version 12 software. For quantitative data, the study utilized questionnaires for data collection. Quantitative data was analysed using descriptive statistics with the aid of SPSS, version 29. Low levels of knowledge about cervical cancer, limited understanding of screening benefits, fear and stigma of being found with cervical cancer and fear of the screening procedure, language barriers, myths

and misconceptions about cervical cancer, poor relationship between the health care workers and clients stemming from age and gender and lastly the women's religious beliefs were some of the barriers identified. In order to enhance cervical cancer screening, better and more targeted information should be provided to address the barriers and specifically the low levels of knowledge that was recognized as a leading barrier in the study. A lack of adequate knowledge about the disease or the benefits of screening prevents women from participating in screening.

Keywords: *Interpersonal communication barriers, cervical cancer, screening.*

AGRO-TOURISM AND EDUCATION: PERSPECTIVES FROM KENYA AND TANZANIA

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Abstract

Tourism has been a key driver of development and among the chief earners of foreign exchange in Africa but a drastic change was witnessed in the last two years due to COVID-19 pandemic. In the post COVID-19 era, each country is trying different methods and ways to lure tourists to their destination including re-visiting the tourism education to empower skills and introducing other types of tourism like agro-tourism. The challenges in tourism education in relation to training, curriculum design, and customer services have been pointed by past scholars. One of the suggested measures was to carry out retraining and reviewing of curricula to meet the skills and competencies in the post pandemic era for the hospitality and tourism industry. Equally, other forms of tourism such as agro-tourism has received less attention yet it has potential of attracting tourists in a destination. The specific objective is to explore the forms of agro-tourism and training programmes from the perspective of Kenya and Tanzania. A systematic literature review will be used to explore agro-tourism and education in tourism. The findings show that despite the existence of agro-tourism practice in both countries, the incorporation into tourism training programmes is missing. Therefore, this study suggests that education in tourism should be widen by including agro-tourism as a form of tourism.

Keywords: Agro-tourism, Education, Tourism, Kenya, Tanzania

WHEN SONGS ARE DRY! AFRICAN POLITICAL ECONOMY AFFIRMATION AND EXPRESSION IN SONGS

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Sub – Theme: *Education, Gender, Security and Inter-State Innovation and Practices for SDGs*

Abstract:

The reflective African affirmation and expression in songs points to the path of attainment or non-attainment of SDGs in their environment. To this response, this article seeks to ask which model works in economic development as far as Political Economy is concerned for Sustainable Development Goals. There are pro - citizens pockets models and pro - bourgeois pockets (whether external or internal). Selected existing cases reveal some relationship between functional political economy and outbursts of songs of affirmation and expression of the reality. Behaviour of citizens often disregard the model at play; capitalism, socialism, or communism may but the outcome backed by decision theory and game theory respectively

can make any of these models work or fail. In the latter case, the songs become dry. When the strongman Mobutu Sese Seko in economic perception did so well, whether by own design or ignited, Franco Luambo Luanzo Makiadi and his music crew gifted a propaganda song "Candidat..." to accelerate his win in a pending elections in 1980s. In East Africa, during the second Presidency, the signs of good leadership by President Daniel Arap Moi received an acclamation for the first 10 years which was dubbed Nyayo era and many songs were sung. As changes in regime style became evident, despair brought in discord but towards the end of 1990s delight culminated when a ray of new regime showed up in 2002 where with pending President Kibaki elections, a different tune of militant song was sung "Who Can Bwogo Me, I am Unbwogable". Repeatedly though inverse, President Uhuru's tenure mirrored by Sino-Railway running and seeming internal stability between him and his main election rival/opposition leader Raila Odinga, a gospel artist Rose Muhando, hit up a song in affirmation reflecting the political environment. In Kenya's neighbouring Tanzania, President Maghufuli's pre second term was ushered in by a great song which shortly followed his farewell to the grave on account of economic excellence. There are moments when songs are dry too. As authors we choose to first reflect on why Africans develop songs so naturally for what is good. Additionally, this article delves into highlighting models of political economy in relation to the citizens wellbeing. Finally, the authors find it necessary to carry out examination of dialectic theory (decision and game theories) in political economy of states. Michel Foucault's ideas on Discourse and Power will be integral in making sense of the songs. This study opts to use descriptive secondary material and musical analysis presented thematically to corroborate findings and conclusions.

Keywords: Political Economy, Songs in Economy, African Economy, Economic Expressions, Expressive Songs, Political Songs, Functional Economy, etc.

KENYA'S PEACE DIPLOMACY IN EASTERN AFRICA: REGIONAL HEGEMON?

Sub-theme: Education, Gender, Security and Inter-state Innovation and Practices for SDGs

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Abstract

Kenya's peace diplomacy in Eastern Africa has encompassed mediation, negotiations, peacekeeping operations, and complex peace restoration efforts in collaboration with other actors. The country has contributed significantly to peace initiatives in the region where most of the countries have suffered wars, civil strives and general instability. These efforts have earned the country global accolades and recognition. They are anchored on the country's peace diplomacy pillar which seeks to consolidate her legacy in promoting peace and stability in countries within the region. This research paper based on the review of secondary data examines the application of Kenya's peace diplomacy to the resolution of conflicts in Eastern Africa. It surveys the elements of Kenya's foreign policy that have bolstered her peace diplomacy in the region, analyzes how the country has engaged herself in the pursuit of peace in a region beset by numerous and complex conflicts and questions whether this role and the nature of its execution is elevating the country into the status of a regional hegemon in Eastern Africa. The article concludes that Kenya has harnessed the combined strength of her imminent leaders and personalities, relative stability, regional economic dominance, and the expansion of the space for regional and continental diplomacy to play a major role in the resolution of conflicts and stabilization in the region. The country has consistently projected herself in her foreign policy stance as a peace-loving nation with solemn honor for the basic international norms of respect for the sovereignty of neighboring states, good neighborliness, the peaceful settlement of disputes and non-interference in the internal affairs of other states. The modest achievements in the peace processes combined with the continuing support for peace and state building efforts in neighboring countries are steadily propelling Kenya into the rank of a regional hegemon and a diplomatic powerhouse in Eastern Africa.

Key words: peace, peace diplomacy, conflict resolution, regional hegemon, Eastern Africa

REINVIGORATION OF LANGUAGE COGNITION AND INDIVIDUAL LANGUAGE TEACHER MAXIMS IN SECOND LANGUAGE PEDAGOGIES.

Sub-Theme Education, Gender, Security and Inter-state Innovation and Practices for SDGs

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Abstract

This article brings into focus the field of second language teaching and learning pedagogies. The notions of language teaching pedagogy continues to undergo revolutions from traditional knowledge of teaching to rational approaches in the current dispensation. Teacher cognition or teacher knowledge base and teacher experiences combine to form a strong pedagogical foundation in language classrooms. The paper purposes to juxtapose the teacher cognition with the individual teacher maxim principles of language in order to determine how cognition informs specific pedagogies, and how teacher maxims relate to teacher cognition. The objectives were; to determine the nature of language teacher maxims, to establish utilization of language teacher maxims in determining language teacher cognition and to compare language teacher cognition with maxims held by language teachers. A qualitative approach was adopted where responses from teachers on their belief principle on pedagogies were utilized. The discussion concludes with recommendations for teacher education and professional development with a focus on teacher maxims

Keywords Language Cognition, Pedagogy, Teacher maxims

CONTRIBUTION OF TEACHER PRACTICES IN THE PROVISION OF STUDENT SAFETY IN EMERGENCY INCIDENTS IN PUBLIC SECONDARY SCHOOLS: A CASE STUDY OF KISUMU COUNTY

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ABSTRACT

This study looked into the critical part that teachers' strategies have in ensuring student safety during emergencies in public secondary schools. Understanding how teacher practices contribute to efficient emergency response and student safety is important. This is because educational institutions encounter a variety of possible hazards that include natural catastrophies and other emergencies caused by people or mere accidents. Through a combination of qualitative and quantitative research methods, it was determined that teacher practices, namely; emergency planning, training and drills, resource allocation, and evaluation, have a moderate impact on student safety. The findings bear great significance in understanding the degree to which distinct facets of teacher practices contribute to their readiness in ensuring student safety during crisis situations in academic institutions. The findings provide valuable perspectives for policymakers in the field of education, as well as administrators and instructors, to refine current safety protocols and enhance teachers' capacity to protect students during emergency occurrences.

Key Words: *Teacher Practices, Student Safety, Emergency Incidents, Public Secondary Schools, Kisumu County*

IMPLEMENTATION ISSUES IN COMPETENCY BASED CURRICULUM TOWARDS SUSTAINABLE DEVELOPMENT IN KENYAN SCHOOLS.

(SUB-THEME -Education, Gender, Security and Inter-State Innovation and Practices for SDGs)

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Abstract

Effective curriculum implementation in education is key to the realization of any country's development goals. It is therefore important that the curriculum implementation process in schools is handled carefully to enable such a curriculum to achieve its intended objectives. It is in this light that this paper seeks to examine the level of human, physical and financial resource mobilization and their essence for the implementation of competency based curriculum in Kenyan schools. This study shall adopt qualitative approach to research and theoretically descriptive and content analysis methods shall be used to analyze relevant studies. It is eventually hoped that the recommendations and way forward will provide some platform for fast and effective implementation of Competency Based Curriculum in Kenya and in the long run have a positive impact on development in the country and beyond.

Key Words: Implementation, Competency Based Curriculum, Curriculum, Kenya

ENHANCING SUSTAINABLE DEVELOPMENT THROUGH NON-TRADITIONAL SECURITY APPROACHES: A COMPREHENSIVE REVIEW OF THE IMPLEMENTATION AND EFFICACY OF COMMUNITY POLICING IN KENYA

Sub-Theme Education, Gender, Security and Inter-State Innovation and Practices for SDGs.

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ABSTRACT:

The intricate relationship between security and sustainable development is widely recognized, with both concepts intertwined in pursuing human-centric progress. Traditionally, the responsibility for ensuring human safety and security has rested with established institutions such as police forces, paramilitary units, armed forces, and various security agencies. However, these conventional security institutions have faced substantial challenges in upholding law and order and providing adequate protection against the myriad of crimes and human insecurities that undermine sustainable development goals. This research paper departs from the conventional security paradigm and advocates implementing community policing as a transformative non-traditional security approach. Community policing, as a multisectoral strategy, directly impacts social inclusiveness at the grassroots level and contributes to national sustainability by emphasising crime prevention over mere detection. It achieves this through proactive measures aimed at deterring criminal activities. Employing the lens of Securitization Theory, this study pursues three primary objectives: (1) examining the role of security in the achievement of sustainable development goals, (2) establishing the application of community policing as a non-traditional security approach in the context of sustainable

development, and (3) identifying challenges and proposing recommendations for bolstering community policing in Kenya to facilitate sustainable development. Data for this study were meticulously collected from virtual archives, online sources, and libraries. The findings overwhelmingly indicate that community policing, by fostering enhanced cooperation between the police and the public through non-conventional means, effectively curbs crime through improved crime detection, intelligence gathering, and reporting. Based on these findings, it is imperative to conclude that community policing, as a non-conventional approach to security, significantly promotes sustainable development by proactively addressing the root causes of crime and insecurity. This research contributes valuable insights to both academic discourse and the field of securitization in the 21st century, shedding light on the potential of community policing as a catalyst for achieving sustainable development objectives.

Keywords: *Community Policing, Sustainable Development, Non-Traditional Security Approach, Inclusive Governance, Democratic Policing*

CIVIL SOCIETY ORGANIZATIONS IN PRE-ELECTIONS PEACE-BUILDING IN CONFLICT HOTSPOT ZONES: A STUDY OF KISUMU COUNTY IN THE LEAD-UP TO KENYA'S 2022 ELECTIONS
Odhiambo Alphonse Kasera³, Thomas Otieno Juma⁴, and Philip Oloo⁵

ABSTRACT

In the sphere of democratization and peace-building in Kenya, prevailing scholarly discourse has predominantly been informed by state-centric narratives, thereby leaving a notable dearth of empirical investigations into the instrumental role played by non-state actors, particularly in the context of consolidating Kenya's electoral democracy. Against the backdrop of Kenya's 2022 general elections, this study scrutinizes the contributions of Civil Society Organizations (CSOs) in the realm of pre-election peace-building initiatives within the historically identified insecurity and conflict-prone zones of Kisumu County. This research endeavors to elucidate the strategies employed in pre-election peace-building, discern the impediments thwarting effective peace-building efforts, and provide recommendations to stakeholders for the enhancement of future multi-actor approaches. The study adopts a qualitative research design, employing key informant interviews structured around open-ended, dialogue-based questions. The sampling process prioritizes relevance over representativeness. Cumulatively, the study's data corpus draws from interviews with 6 law enforcement officers, 4 Independent Electoral and Boundaries Commission (IEBC) officials, 6 politicians, 2 officers from the Office of the Registrar of Political Parties (ORPP), 3 leaders of CSOs, 10 peace-building or relevant field and program officers, and 20 community members selected from various locales, including Obunga (5), Manyatta (4), Kondele (6), Nyalenda (4), and Nyakach-Nandi bordering communities (5). Data analysis was facilitated through Atlas.ti Web, incorporating AI-driven coding and systematic analysis of transcribed interview data. The study was conducted between May 2022 and August 2023, spanning two rounds of data collection. The first round, from May to September 2022, entailed firsthand observation of peace-building activities and election campaigns as they unfolded in the lead-up to the August elections. These observations were recorded using an observation protocol and a research diary. The study's observations yield several key insights. Firstly, CSOs employ two principal categories of strategies: those aimed at preventing and mitigating electoral and other conflicts, and those geared towards promoting dialogue, reconciliation, and community engagement. Secondly, the effectiveness of CSOs in executing these roles and engendering favorable conditions depends substantially on their autonomy or susceptibility to political interference, as well as their financial resources and networking capabilities. Thirdly, stemming from these observations, a comprehensive set of recommendations emerges, with a primary and overarching suggestion being the imperative of adopting a multi-stakeholder approach to transform the political context in which peace-building occurs. This approach is not only vital for optimizing the effectiveness of CSOs but also for fostering an environment conducive to achieving Sustainable Development Goal 16 and advancing the vision outlined in Kisumu County's second-generation County Integrated Development Plan (CIDP) 2018-2022.

Keywords: *pre-elections, peace-building, strategies, challenges, CSOs, Kisumu County, Hotspots areas.*

SEMIOTICS OF THE STATELESS: SIGNIFICANCE OF OBJECTS OF CITIZENSHIP AMONG IMMIGRANTS, DISPLACED AND MINORITY COMMUNITIES IN KENYA

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Abstract

Since the turn of the 20th century, scholars in humanities and social sciences have appropriated semiotics in order to appreciate human behaviour and cultures. This paper endeavours to read the symbolism inherent in documenting citizenship and the impact this documenting has on the lives of stateless people in Kenya. KNHRC & UNHCR (2010) approximates that about 12 million people around the world are stateless. This research appropriates the words 'stateless', 'immigrants', 'displaced', and 'minority' to refer to people of other states and continents that have found themselves resident in another country such as Kenya in the course of the country's history. Originally, Kenyan people consisted only of the natives and/or nations that peopled the country up to the colonial period. Subsequent to that, Kenya's interaction with visitors from other countries and continents over time has seen the entry and integration of people from other countries into the Kenyan citizenry. This integration has not been without its challenges. In most cases, it has taken decades of bureaucratic red tape for the stateless to be recognized, naturalised and integrated by the Kenyan authorities, as a natural state obligation under International Law. Admittedly, however, the recent history of Kenya has shown the government committed to integrating people with origins from other states into the Kenyan territory for citizenship. This research seeks to investigate the symbols and objects that characterise the alienation, and quest to belong by immigrants, the displaced and minority. *The study will examine the symbolism inherent in documents and objects of citizenship namely birth certificate, national identity card, and passport. Further, the research shall interrogate how this symbolism of alienation reflects on national building and the character of the Kenyan state (or citizenship).* To accomplish this objective, this research shall look at the case of two formerly stateless communities, namely the Makonde and Shona, and two communities that are still stateless, namely the Pemba minority and Burundi/Rwandis minorities. The study shall employ the theory of Semiotic Sociology (Heiskala, 2021) and other relevant sociological theories as advanced by Swingewood (1972).

Key Words: Stateless People, Minorities, Objects of Citizenship, Semiotics, Integration, Citizenship, Immigrants, Assimilated Nations

COMMUNICATION STRATEGIES EMPLOYED BY THE RADIO TALK SHOW PRESENTERS INFLUENCING ORAL PRESENTATION EXPERTISE AMONG UNIVERSITY STUDENTS IN ELDORET TOWN

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Majority of the consumers of radio media are the youths most of whom constitute students in high schools, colleges and universities. The media influences how people choose and use different channels and means of communication. Therefore, main objective of this study was to examine the communication strategies employed by the radio talk show presenters and its influence on oral presentation expertise among university students in Eldoret Town. The study utilized a descriptive survey research design and was guided by the Uses and gratification theory. The target population of the study were all the students of university campuses within Eldoret town and the sample size was 300. The researcher adopted simple random sampling technique to arrive at the sample that would best fit or present intended purpose of research. Data was collected using a questionnaire. The collected data was analysed using descriptive statistical techniques that include frequencies, percentages, means and standard deviation. The data was then be

presented by use of tables, pie-charts and bar graphs. According to the study findings, the majority of respondents accessed audio media. The style of music played on a radio station influenced the student's decision to listen to it. The study concluded that the university students have a diverse range of preferences when it comes to FM radio programmes. Effective communication strategies employed by radio talk show presenters are crucial in engaging university students. While music preference plays a relatively minor role, the variety and nature of programmes, content relevance, language used, presenter characteristics, inclusion of knowledgeable panel members, programme timing convenience, interactivity through phone-in segments, and the presence of minimal commercial breaks are significant considerations for students. The study recommended that radio stations targeting university students should aim to provide a diverse range of programmes that cater to their varied interests, including current affairs, music, and engaging discussions.

Keywords: *Communication Strategies, Radio Talk Show, Presenters Oral Presentation, Expertise University Students*

KENYA'S HUMAN RIGHTS LAW AND ARTIFICIAL INTELLIGENCE: THE DILEMMA.

Subtheme: *Education, Gender, Security and Inter-State Innovation and Practices for SDGs*

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ABSTRACT

Rapid adoption of artificial intelligence (AI) technologies and increased reliance upon AI by both governments and the private sector have led to rising concern about potential negative implications for human dignity, democratic accountability, and the bedrock principles of free societies. A global governance framework is needed to address the wide range of societal challenges associated with AI, including threats to privacy, information access, and the right to equal protection and nondiscrimination. Rather than working to develop new frameworks from scratch, different scholars argue that the challenges associated with AI can best be confronted by drawing on the existing international human-rights framework since human rights impacts of artificial intelligence (AI) are complex. The full range of civil, political, economic, social, and cultural rights protected by international and Kenya National Human Rights Commission laws are affected by current uses of this family of technologies. Such impacts vary considerably based on how AI is implemented in particular cases. Correspondingly, some rights holders experience positive impacts on their enjoyment of certain rights, even as others suffer negative impacts. Most AI implementations touch upon the right to privacy as guaranteed by international and Kenyan law. Furthermore, there are well-documented concerns about how machine learning technologies can perpetuate patterns of bias that are encoded into the data that is used to "train" such systems. This paper systematically analyzed Kenya's human rights laws and the status of AI with a focus on the rights to equality and non-discrimination. The paper also suggests how the law can evolve to ensure that AI promotes positive human rights outcomes. The study adopted a desk top review methodology.

Key Words: *Artificial Intelligence (AI); Human Rights; Kenyan Law; Kenya National Human; Rights Commission; International Human-Rights*

POWER DISPARITIES: "EMPLOYEE – EMPLOYER – TRADE UNION" RELATIONAL MATRIX FOR ORGANIZATIONAL MOTIVATED SERVICE FORCE DEVELOPMENT

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Sub – Theme: *Education, Gender, Security and Inter-State Innovation and Practices for SDGs*

Abstract:

By asking a seemingly obvious question; are Trade Unions role important in 21st century organizational development? This article seeks to explicate the truism in this by benefitting from scholarly relational comparatives between *employee-employer-trade union* matrix. Whereas the goal of Trade Unions is appreciated in legal frameworks as fundamental to organizations' human resource motivated service force and for their individual and collective development in realization of Agenda 2030 and the Sustainable Development Goals (SDGs) for priorities such as; decent work, elimination of inequalities, just transition, and civil society participation in work related rights. Additionally, whereas agenda 2030 in achieving SDGs is globally universal to all States (developed and developing) in realizing its stated goals nationally under regional and global monitoring mechanisms. It's probable that the power disparities in the relational matrix between the three in many organizations especially in developing States have become an obstacle to the ultimate beneficiary - "the worker". This paper seeks to find out how the employee-employer attempts to address their relational matrix for the development of the service force. The major question here being whether a conscious employer can cut power disparity lines in making both the employee and the organization attain the SDG goals. Again, thirdly, the article seeks to examine *predatory-prey* relationship in trade union-employee relations as agentic factor or obstacle in achieving the SDGs. We ponder in our discourse in the tripartite relational matrix of the likely outcome through an SHT Model (Sit-Hit-Talk) and its effect to the SDG goals as we the thoughts herein to Transactional Theory. The study will be descriptively guided to arrive at its conclusions that; to uphold freedom of association, to champion social dialogue, and giving room for collective bargaining is a necessity not only for full development of a motivated service force but for a credible and thriving organization.

Keywords: *Union Employee Relations, Employer Employee Relations, Power Disparities, Labour Unions, Trade Unions, Work Relations, Motivated Workforce, Transactional Theory, and Workforce Management*

FACTORS AFFECTING COMPLETION OF GRADUATE STUDIES IN PUBLIC UNIVERSITIES: A CASE STUDY OF UNIVERSITY OF KABIANGA, KENYA

GRADUATE STUDIES FACTORS AND COMPLETION IN PUBLIC UNIVERSITIES: A CASE STUDY OF UNIVERSITY OF KABIANGA, KENYA

Sub theme : EDUCATION

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2. Dr Eric Mibei PhD, University of Kabianga, Department of Clinical Medicine,

Abstract

The study examined the factors affecting completion of graduate studies in public universities in Kenya. Stakeholders have been in dilemma on what really contributes to graduate students graduating after stipulated programme time. This study therefore sought to determine the factors affecting completion of graduate studies in public universities a case study of University of Kabianga, Kenya. Specifically it examined student, supervisor and institutional factors role in completion of graduate studies. The study findings are very important in informing and suggesting actions to address the delays. The study used descriptive research design. The target population was 303 and a sample of 33% was randomly selected to respond to questionnaires. A total of 100 questionnaires were distributed but 64 questionnaires were returned comprising a response rate of about 64% which is an acceptable rate and was therefore considered adequate to carry out the analysis and make conclusions. Descriptive statistics in form of frequencies, percentages, means and standard deviation was used to analyze the data and results presented in tables. The study established that financial constraints, job related assignment and duties, students' own commitment, academic and research environment, lack of motivation, post-marriage domestic responsibilities, poor guidance in topic selection, inability to use modern tools of communication, imposing of research topics by supervisors, lack of preparation and poor language skills affect

postgraduate students completion of their studies on time. The recommendation of the study is for the students, supervisors and institution to address the challenges identified in order to improve graduate studies completion on stipulated programme time.

Key Terms: completion of graduate studies, student factors, supervisor factors , institutional factors

ACQUISITION OF NURSING SKILLS AND SUPERVISION IN TECHNOLOGY ENABLED LEARNING IN KENYAN UNIVERSITIES RESEARCH AND TECHNOLOGY COMMERCIALIZATION

Thomas Ng'ambwa, Clinical Scholar University of Kabianga, Lilian Isiaho, Kaimosi University, Dr Tecla Sum, Masinde Muliro University.

This research delves into the integration of technology-enabled learning (TEL) within Kenyan universities, focusing on nursing skill acquisition and supervision. In the dynamic landscape of nursing education, technology's role in enhancing teaching and learning is increasingly significant. The study investigates how TEL platforms are used in Kenyan universities to teach nursing skills and offer effective supervision, aiming to improve nursing education and practice holistically. Employing a mixed-methods approach, the research combines qualitative and quantitative methodologies for comprehensive data collection. Qualitative insights stem from in-depth interviews involving nursing educators, students, and administrators. Quantitative data is derived from surveys administered to a diverse sample of nursing students across four nursing schools in four distinct universities. These methods enable a comprehensive examination of technology integration, its impact on skill acquisition, and its effectiveness in providing supervision within the nursing curriculum. Key findings underscore the positive influence of technology-enabled learning on nursing skill acquisition. Tools like virtual simulations, multimedia resources, and interactive platforms are identified as valuable enhancers of practical learning experiences. Technology facilitates real-time student-instructor communication, fostering timely feedback pivotal for skill development and supervision. However, challenges such as internet access reliability, digital literacy, and potential resource disparities emerge as barriers to successful TEL implementation in nursing education. The research emphasizes the significance of faculty training and support in harnessing technology for nursing education. It advocates for a comprehensive framework seamlessly integrating TEL into the nursing curriculum, aligning with educational objectives and standards. Recommendations span from tailored TEL resource development to establishing robust technical infrastructure and fostering collaborative partnerships between universities, healthcare institutions, and technology providers. This study augments the evolving understanding of TEL in nursing education, particularly within Kenyan universities. By scrutinizing nursing skill acquisition and supervision through TEL, the research furnishes insights into challenges, benefits, and potential strategies for effective integration. Ultimately, the findings guide curriculum development, pedagogical approaches, and institutional policies, propelling the quality of nursing education and healthcare delivery in Kenya forward.

Key Words: Technology-enabled learning (TEL), Kenyan universities, Nursing skills, Supervision, Integration of technology

BEYOND ELITIST FEMINISM: AN INTERSECTIONAL ANALYSIS OF THE NATURE OF POLITICAL PARTICIPATION DURING CAMPAIGNS IN RURAL POOR AREAS OF KENYA

Odhiambo Alphonse Kasera⁶, Barack Calvince Omondi⁷, Phanice Wangila

Sub-theme: Innovative Approaches on Education, Gender, and Security for Inter – State Relations

ABSTRACT

The discourse on women's empowerment and political participation has traditionally been characterized by elitist perspectives, primarily centering on women actively seeking for, and securing political positions, neglecting the experiences of marginalized populations, particularly poor women in rural areas. Some hope has come lately though, with the emergence of intersectionality as a framework, pioneered by Kimberle Crenshaw and later applied to feminism as "Intersectional Feminism" by Taylor Hawk; ushering in a more nuanced understanding of gender dynamics; effectively enlarging the gender analytic toolbox. This study, undertaken in four Luo Nyanza Counties in the context of the 2022 political campaigns, employed an intersectionality and elite theory frameworks to examine rural-based voters' roles and experiences. Qualitative-interpretivism was employed as the blueprint to data collection and analysis. Study population represented a balance of voices of stakeholder including, **rural-based women voters (40), and women in political positions (4), local administrators/community gatekeepers (8), elections officials (8), cultural and traditional leaders (4), and political party's leadership (8), Office of the Registrar of Political Parties (ORPP) (4).** It discerns seven distinct role typologies during political campaigns; mobilizing, influencing, cheerleading, campaign funding, providing security, playing domestic chores, and sexual entertainment. Notably, gender, disability, education, employment status, and patron-client politics intersect to perpetuate disadvantages for women, hindering their participation while subjecting them to abuse and contributing to the masculinization of the active and relatively empowered women cohort in their political roles. Importantly, duty-bearers such the political class - and to a great extent key institutions created to protect voters from electoral malpractices and offenses - both men and women, appears complicit in maintaining the status quo, disregarding electoral governance frameworks and leaving vulnerable rural voters behind. This study underscores the urgency of shifting research focus away from elitism in gender and political participation, emphasizing the need for the voices of the majority of impoverished rural residents. This call for action is in line with the imperative of 'leaving no one behind' enshrined in the Sustainable Development Goals (SDGs).

Key words: *intersectionality, political participation, rural voters, elitist feminism, intersectional feminism.*

INFLUENCE OF ENVIRONMENTAL DYNAMISM ON IMPLEMENTATION OF UNIVERSAL HEALTH COVERAGE IN KENYA

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ABSTRACT

Universal health coverage (UHC) is an important and noble objective for quality healthcare service delivery for all citizens in any country, however, it needs to be anchored on a robust policy framework. However, environmental dynamism evident in the changing policy implementation environment could impair the stakeholders' commitment towards this initiative. Therefore, the aim of this study was to establish the effect of Environmental Dynamism on the achievement of Universal Health Coverage in Kenya. The study adopted a descriptive research design targeting UHC stakeholder organizations including the Ministry of

Health, public and private social health insurers, donor fund agencies, as well as public and private healthcare providers in the country. From these, a sample size of 234 organizations were selected using mixed sampling techniques to participate in the study. Data was collected through questionnaires and interview schedules. Data was analyzed using descriptive statistics and inferential statistics, that is, bivariate linear regression analysis. The study found that environmental dynamism significantly affects the achievement of Universal Health Coverage in Kenya. Environmental dynamism constructs among them current changes in the healthcare sector, volatility of the political climate, stable policy environment, economic instability and social stability considerably affected the implementation of UHC in Kenya. Therefore, as environmental dynamism increases, it will be difficult for all involved parties, such as the top management team, stakeholders, and others, to successfully implement the UHC policy in the country. The study, therefore, recommends that there is need to create mechanisms to ensure stable policy implementation in the face of environmental dynamism. The models used for UHC achievement should be reviewed and modified for long-term sustainability and to cushion them from externalities in the implementation environment.

Keywords: *Universal Health Coverage, Health Policy, Environmental Dynamism, Long-Term Sustainability, Implementation Environment*

SUSTAINABLE EDUCATIONAL DEVELOPMENT THROUGH ACCESS TO INFORMATION: A KENYA PERSPECTIVE. EDUCATION, GENDER, SECURITY AND INTER-STATE INNOVATION AND PRACTICES FOR SDGS.

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Abstract

This research focuses on the significance of information access in supporting long-term educational growth in Kenya. Accessibility to information is critical for empowering individuals, improving educational potential, and accelerating socioeconomic advancement. In Kenya, where educational differences persist, enabling fair access to information becomes critical as enshrined in the sustainable development goals agenda. The study focuses on many facets of information access, such as infrastructure, digital resources, libraries, and educational materials. It investigates the obstacles confronting key educational stakeholders and institutions in obtaining relevant and high-quality information in Kenya. Furthermore, it investigates the influence of government policies, technical improvements, and community involvement in closing the knowledge gap. This study contends that access to information is critical for fostering lifelong learning, increasing enrollment rates, improving academic performance, and improving teacher professional development. Furthermore, the influence of information disparity on marginalized communities, such as rural areas and underserved populations, is examined in this research. It emphasizes the importance of call for actions in order to reduce gaps in access to information and achieve educational inclusion. Furthermore, the research investigates the importance of information literacy in maximizing the benefits of information access. It emphasizes the necessity of teaching students and educators how to critically assess, interpret, and use information effectively. It goes through the possibility of incorporating information literacy into the curriculum, teacher training programme, and community outreach activities. Finally, this research emphasizes the importance of long-term educational progress in Kenya through information availability. It encourages government agencies, educational institutions, civil society organizations, and foreign partners to work together to prioritize and invest in initiatives that

promote equitable access to information. Kenya can establish a vibrant and inclusive education system that contributes to social advancement, economic prosperity, and long-term development by empowering individuals with knowledge and information.

Keywords: Access, Education, Information, sustainable development Agenda, Kenya.

FINANCIAL LITERACY AND RETIREMENT PLANNING BEHAVIOUR IN THE KENYAN INFORMAL SECTOR

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Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development Abstract:

This study addresses the critical issue of financial literacy and retirement planning behaviour within the Kenyan informal sector. The informal sector is a significant contributor to the Kenyan economy, yet retirement preparedness remains a challenge in this context. This research aims to investigate the relationship between financial literacy and retirement planning behaviour in the Kenyan informal sector, ultimately providing insights for targeted financial education programs.

Problem: Despite the prevalence of informal employment, many individuals in Kenya's informal sector lack adequate retirement planning, leading to financial insecurity in their later years.

General Objective: To examine the impact of financial literacy on retirement planning behaviour among informal sector workers in Kenya.

Methodology: This cross-sectional study will target diverse segments of the informal sector in five selected Kenyan counties. Data will be collected through online administered questionnaires and performance-based measures of financial literacy. Retirement planning behaviours will be assessed using a five-point Likert scale. The study will utilize statistical regression analysis to explore the relationship between financial literacy and retirement planning behaviour.

Conclusions: The research aims to establish whether a positive relationship exists between financial literacy and retirement planning behaviour in the Kenyan informal sector. The study expects to find that individuals with higher levels of financial literacy are more likely to engage in effective retirement planning.

Recommendations: The findings from this study can inform the design of targeted financial literacy programs tailored to the needs of the Kenyan informal sector. Policymakers and

organizations can use these insights to promote retirement preparedness among informal sector workers.

Outputs: This research contributes to the growing body of knowledge on financial literacy and retirement planning in the informal sector, potentially leading to improved financial well-being for a significant portion of the Kenyan population.

Keywords: Financial literacy, retirement planning behaviour, informal sector, Kenya, crosssectional study.

LITERARY ARTISTS AND AFRICAN WITCHCRAFT: THE UNENDING SEARCH FOR SOLUTIONS

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Abstract

Man is the most rational and manipulative being. Men and women will always look for solutions to problems and issues affecting them. This search for solutions is at the first instance located within the natural sphere. When nature fails to provide adequate answers, human beings often turn to the spiritual sphere for answers. Witchcraft, also referred to as sorcery or black magic, falls anywhere between the natural and the

spiritual or supernatural. The practice is an age-old one and, according to anthropological studies, cuts across all the continents of the world. This paper concerns itself with the rendition of the practice from a Swahili literary perspective. The analysis aims at attempting to understand the reality of the practice, its social effects and reasons for its persistence in the society. We analyse the practice of witchcraft as depicted in two Swahili works of art namely *Kisima cha Giningi* (Abdulla, 1968) and *Hatima yangu ni ipi?* (Chipeta, 2010). These two novels present the practice in two different ways thus attracting the attention of the reader to curiously and critically interrogate the whole practice. The two have been purposively selected as they depict the practice and have been subjected to content analysis to unearth the inherent belief concerning witchcraft and the artist's point of view concerning the same. The analysis is guided by realism. It is baffling that even with the advancement in science and technology, and even with the more practical solutions offered by major religions of the world, such a vicious practice that simply escapes human understanding still persists. As such, this analysis widens our perception of the practice of witchcraft as a diehard social practice.

Key words: *witchcraft, literary art, Swahili, African, sorcery, effect*

ROLE OF SECONDARY SCHOOL ADMINISTRATORS' MENTAL HEALTH LITERACY IN IMPLEMENTATION OF MENTAL HEALTH PROGRAM IN SUB-COUNTY SECONDARY SCHOOLS IN AINAMOI SUB-COUNTY, KERICHO.

1. Dorothy C Soi,¹ Department of Education Administration, Planning and Management, University of Kabianga

and

2. Janet Surum ² Department of Psychology and Foundations University of Kabianga

Abstract

Mental health is a critical component of an education system and the overall well-being of learners. The psychosocial and cognitive development of learners largely depends on their mental well-being (Kenya School health Policy, 2019). Mental health literacy is therefore an urgent goal in public health and education and, hence, should be integrated in the school context as a component of comprehensive school health program. This study aimed to examine the role of mental health literacy of school administrators in the implementation of the mental health program under the comprehensive school health program. The specific objectives that the study sought to achieve are; to establish the level of mental health literacy among school administrators and, to establish the relationship between the mental health literacy of school administrators and the level of mental health program implementation. This study used a descriptive research design with a sample size n=61 school administrators which consisted of school principals, deputy principals and heads of departments. The research instrument is a questionnaire with a modified mental health literacy scale which was used to measure the level of mental health literacy among school administrators and the level of mental health program implementation in schools. Descriptive statistics included frequency counts, percentages, means and standard deviation whereas inferential statistics involved Pearson Product Moment correlation coefficient and Regression Analysis. The findings from this study will serve as a needs analysis for mental health capacity building among school administrators. Further, the findings may improve the management of mental health issues among learners and their general well-being.

Keywords: *school administrators; mental health literacy; mental health program; secondary school*

SECURING THE LIFE OF STUDENTS IN UNIVERSITIES": A CASE STUDY OF UNIVERSITY OF KABIANGA Sub-theme: Education, Gender, Security and Inter-State Innovation and Practices for SDGs.

HELLEN KESUI

ABSTRACT

Cases of suicide have been reported and are increasing each year in almost all the universities causing a lot of insecurity among other students, parents, the communities and even the Management of the universities. The purpose of this study is to secure the life of students in universities: A Case Study of University of Kabianga. The study will be guided by the following specific objectives; To Determine the causes of suicide among students in University of Kabianga. To find out the impact of suicidal cases among students in University of Kabianga. To establish the measures of averting suicidal cases among students in University of Kabianga. Target population is 2956 and the sample size will be 296. Questionnaires and Interviews will be used. Peer Counselors will be purposively sampled to be interviewed. Stratified Sampling Technique will be used on the students. Quantitative and qualitative methods of data collection and analysis will be used. Chi square, Pearson moments correlation and Regression analysis will be used. Document analysis and reported cases of suicide will be considered. SPSS software will be used in coding and analyzing data. The findings of the study will be used by the University organs in forming policies. They will also be used in educating the students and in decision making by the University. The findings will instill knowledge on other students contemplating suicide in future as this will be used by counselors/Peer counselors to guide and counsel students in various institutions. This study is justified because many cases of suicide continue to be reported in the University of Kabianga and even other universities in Kenya. Guidance and counseling services in institutions of higher learning are provided but the menace is still there as 3 students were reported to have committed suicide in 2021/2022, 2 in 2020/2021, 2 in 2019/2020 and 1 in 2018/2019 in the University of Kabianga alone. Many more students contemplated suicide during those years. It is hoped that these findings will help to alleviate the cases of suicide and secure the life of students in Universities.

A COMPREHENSIVE APPROACH TO THE FOUR PILLARS OF SDGs: EDUCATION, GENDER, SECURITY, AND INTERSTATE INNOVATION IN THE 21ST CENTURY

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Abstract:

The United Nations' Sustainable Development Goals (SDGs) present a transformative framework aimed at addressing global challenges and fostering a sustainable future for all. This paper delves into the interconnectedness of *four pivotal pillars* of the SDGs: *Education, Gender, Security, and Interstate Innovation*, and explores their significance and relevance within the context of the 21st century. *Education* emerges as a vital force in empowering individuals, catalyzing economic growth, reducing inequality, and promoting sustainable practices. *Gender equality* is not merely a matter of social justice but also a fundamental prerequisite for sustainable development, necessitating economic empowerment, equitable access to education and healthcare, and the eradication of gender-based discrimination. *Security* takes on new dimensions in the 21st century, characterized by geopolitical tensions, cyber threats, and climate-induced conflicts that disrupt global stability. Upholding peace, justice, and robust institutions is imperative in addressing these challenges and promoting inclusive societies. *Interstate Innovation* recognizes the pivotal role of technology, international cooperation, and knowledge sharing in achieving the SDGs on a global scale. It underscores the significance of forging strong partnerships between governments, businesses, civil society, and international organizations to facilitate collective action. By integrating these *pillars*, the paper presents a methodology that accentuates the interconnectedness of the SDGs, calling for cross-sectoral collaboration, policy coherence, and the integration of innovative solutions. International cooperation becomes imperative in addressing shared global challenges, with technology emerging as a transformative tool to advance sustainable development. Drawing upon existing literature, case studies, and policy frameworks, this study offers a comprehensive approach that emphasizes inclusive, equitable, and innovative strategies to achieve the SDGs. It underscores the paramount importance of collective action as the cornerstone for building a more sustainable and equitable world.

Keywords: Education, Gender, Security, Inter-State Innovation, SDGs

STRENGTHENING THE ROLE OF SCHOOLS IN THE PROMOTION OF PUBLIC INTEGRITY FOR SUSTAINABLE DEVELOPMENT GOALS IN KENYA

Education, Gender, Security and Inter-state Innovation and Practices for SDGs

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Abstract

Purpose: Education is one of the Sustainable Development Goals (SDG 4) and is both a goal and a means for achieving all the other goals. The development of persons of integrity starts with the education of young people in schools. The skills, behaviour and knowledge acquired in school highly contribute to shaping the future of a country. While the notion of teaching public integrity values is generally accepted in Kenya, strengthening this core value in the school system still presents great challenges. **Design/methodology/approach applied:** This paper employs a literature review approach to explicate discussions, recommendations and conclusions. **Main findings:** There is an increasing trend in Kenya to provide support for the teaching of public integrity, in the Competence Based Curriculum (CBC), integrity is a core value. CBC has incorporated teachings and activities into curricular or extracurricular programs that emphasize the duties and obligations of a citizen. Thus, public integrity is strengthened and promoted, which can assist ensure that civic norms and ideals become part of young citizens' everyday lives. **Practical implications:** The school system is important in inspiring norms for public integrity at a very young age. Strengthening public integrity calls for the raising of awareness on the benefit of public integrity, and reducing tolerance of violations of public integrity standards. **Originality/value:** There is a growing trend globally where countries are using school systems to raise awareness to young people on the importance of public integrity. Although the new curriculum (CBC) is the vehicle that will help in strengthening public integrity, there is a big gap in the research area on how to strengthen it since the previous reforms on education curriculum have not lived up to the initial or original conceptualization.

Key words: Curriculum, Education, Public Integrity, Strengthening, and Sustainable Development Goals

POLICY, DILEMMA AND PRACTICES IN KENYA'S BILINGUAL EDUCATION PROGRAMMES

Sub-Theme: Education, Gender, Security and Inter-state Innovation and Practices for SDGs

By

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Abstract

Bilingual Education involves teaching academic content in two languages, in a native and secondary language with varying amounts of each language used. Simply put, Bilingual education is use of two languages as a media of instruction. In this paper, I argue that the purpose of bilingual education is not to teach mother tongue (MT), English or a second language but rather to teach children concepts, knowledge and skills through the language they know best and reinforce this information through the second language. There is a clearly stated national language in education policy in Kenya, which could be said to be bilingual by nature. There are also indications that the language policy as far as the teaching of the indigenous Kenyan languages and the language of instruction in the schools is concerned, is not practical. As regards to medium of instruction policy, research has shown that actual practice in the classrooms is often at variance with the stated policy. According to the current policy, children in primary schools should be learning through their indigenous languages more than through English, however, primary school teacher training colleges in Kenya do not offer courses on teaching through indigenous languages. Data was collected by using a portable tape recorder and thereafter transcription was done before analysis. Given this scenario I argue that bilingual education is not considered and implemented as an important factor in the teaching-learning process in Kenya's educational system.

Key words: Bilingual education, policy, politics, practices, English teacher education

GENDER DIFFERENCES IN THE ACADEMIC RESILIENCE OF PUBLIC SECONDARY SCHOOL STUDENTS IN TURKANA COUNTY, KENYA

Janet Surum

Abstract

Academic resilience is a resource that students can draw from to bounce back during difficult phases in their academic life. In this era of escalating mental health issues among students, academic resilience is considered a reservoir for difficult times. However, the individual differences in the ability of a student to bounce back and the extent of their elasticity is gender controlled. Turkana County is the most marginalized county in Kenya, but the level of elasticity displayed by some students from this county provokes empirical research. The aim of this study was to establish the gender differences in the academic resilience of public secondary school students in Turkana County. This study adopted a mixed research methodology, with a concurrent embedded design. A sample of 377 form four students was used. A demographic form and the academic resilience scale for high school students by Martin and Mash (2006) was adapted to collect data from the students. This study hypothesized that there is no significant mean differences between student's gender and academic resilience. A one way ANOVA was computed, with mean scores of males and females. The findings revealed that there was a significant difference in academic resilience between boys and girls $F(1,376) = 6.155, df=377, P=.05$. The results showed that female students are more academically resilient than male students. This study recommended that further research be carried out on how to promote academic resilience among boys.

Keywords: Academic Resilience; Gender, Marginalization

WIRELESS STETHOSCOPE FOR ENHANCED CARDIAC AUSCULTATION TRAINING AND DIAGNOSIS Innovation to advance medical education and improve patient care

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Abstract

Traditional stethoscopes often present limitations in delivering accurate and clear cardiac auscultation experiences. By leveraging wireless technology, we propose a novel solution that enhances the fidelity of heart sounds, providing an immersive and realistic learning experience. The wireless stethoscope incorporates advanced digital signal processing algorithms and an ergonomic design to optimize signal transmission and reception. By minimizing ambient noise interference and maximizing the amplification of cardiac sounds, the device ensures clearer and more distinct audio output. This innovation enables medical students to perceive subtle variations in heart sounds and develop their auscultation skills with greater precision. Furthermore, the wireless functionality enables seamless connectivity to a mobile application or computer software, facilitating real-time audio recording, playback, and visual representation of heart sounds. This integrated educational platform offers students and health care providers the opportunity to revisit and analyze recorded auscultation sessions, enhancing their ability to identify specific heart sounds, murmurs, and abnormalities. Successful implementation of the wireless stethoscope has the potential to revolutionize cardiac auscultation training by addressing the limitations of current methods. By improving the accuracy and fidelity of heart sounds, this innovation aims to bridge the gap between theoretical knowledge and practical application in medical education. Further research and development in this area can significantly contribute to the advancement of medical education and the improvement of patient care.

Key words. *Wireless stethoscope, cardiac auscultation, heart sounds, patient care.*

POST-DISCHARGE EXPERIENCES AMONG CAREGIVERS OF PRETERM BABIES IN KERICHO COUNTY, KENYA

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Abstract

Worldwide, at least 15 million preterm babies are born yearly, of which 1 million succumb to the complications directly related to premature birth. Premature birth is defined as gestational age of less than thirty seven weeks. Sub-Saharan Africa and Asia contribute up to about 60% of the world's preterm births with the highest mortality rate worldwide for children aged between 0 to 5 years old. In Kenya, the prevalence of preterm birth in Kenyatta National Hospital is 18.3% while the mortality rate of preterm babies under 5 years is about 7% per year countrywide. The aim of this study was to understand the experiences caregivers of preterm babies face at home in the first 6 months post-discharge. This was a phenomenological study. Sixteen preterm caregivers were interviewed using a semi-structured questionnaire at the participants' convenient place after purposeful homogeneity sampling was done at A.I.C Litein Mission and Kapkatet County hospitals' outpatient clinics. Data was audiotaped then transcribed into hard copies and lastly analysed into relevant themes. The ages of the caregivers ranged from 25 to 42 years old and their mean was 34. The gestational age of the babies at birth ranged between 26 to 32 weeks, their birth weight was between 900 grams to 1900 grams, and their hospital stay was 7 – 90 days. 100% of the caregivers had formal education. 93.75% were married while 6.25% were single mothers. The following themes were explicitly articulated: Care of the preterm baby; care of the caregiver; psychosocial support; and communication pitfalls. The caregivers had both good and bad experiences that included psychosocial support, social isolation, and stigmatization. In order to strengthen the psychosocial support and to overcome the challenges, there is need to amalgamate patient oriented care to that of community oriented care.

Keywords: *Preterm, premature, birth, experiences, caregivers*

POWER DISTANCE AND SAFE-SEX MESSAGING: ASSESSING THE EFFECTIVENESS OF CONDOM ADVERTISEMENTS AMONG UNIVERSITY STUDENTS IN KENYA.

Sub-Theme : Innovative Approaches in Preventive, Curative and Rehabilitative Health Care

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Abstract

The present study explores the impact of power distance on the effectiveness of safe-sex messaging, focusing on condom advertisements targeted at university students in Kenya. With the aim of curbing the spread of sexually transmitted infections (STIs) and unplanned pregnancies, the research delves into the intricate interplay between power dynamics and the reception of condom campaigns among this specific demographic. Kenya faces a significant public health challenge concerning the prevalence of STIs and reproductive health risks. Traditional societal norms in Kenya often emphasize hierarchical power structures, where authority figures hold considerable influence over younger generations, shaping students' perceptions, attitudes, and behavioral responses to safe-sex messaging, potentially hindering the effectiveness of condom advertisements. To investigate this phenomenon, a mixed-methods approach is employed, encompassing both quantitative and qualitative data collection methods. Surveys are conducted among a diverse sample of university students, providing insights into their knowledge, attitudes, and beliefs related to condom use and the portrayal of safe-sex messaging in advertisements. Additionally, focus groups and in-depth interviews are conducted to gain a deeper understanding of the

underlying cultural factors influencing condom perceptions and the role of power distance. The findings shed light on how power distance impacts students' susceptibility to condom advertisements' messaging strategies and their willingness to adopt safe-sex practices. The implications of this research are significant for policymakers, public health practitioners, and marketing professionals involved in designing safe-sex interventions in Kenya and other culturally diverse contexts. Understanding the role of power distance in shaping attitudes towards safe-sex messaging can help tailor campaigns that resonate with the target audience. In conclusion, this study bridges the gap in the literature by examining the impact of power distance on the reception of condom advertisements, contributing valuable insights to the fields of health communication, public health, and cross-cultural marketing strategies.

Keywords: *Power distance, Condom, Advertisement*

REVOLUTIONARY MOSQUITO ZAPPER: A NOVEL APPROACH FOR EFFICIENT MOSQUITO CONTROL AND DISEASE PREVENTION.

INNOVATION IN PUBLIC HEALTH

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Abstract

Mosquitoes continue to pose a significant threat to public health, causing millions of deaths worldwide and transmitting life-threatening diseases such as malaria, dengue fever, and Zika virus. Conventional mosquito control methods have limitations in effectively reducing mosquito populations, necessitating the development of innovative solutions. Here, we present an extraordinary innovation: The Mosquito Zapper. The Mosquito Zapper is an advanced device designed to physically eliminate mosquitoes and disrupt their breeding cycles. By combining an efficient suction mechanism with the targeted use of pheromones, the device effectively attracts and kills flying mosquitoes in the surrounding environment. The integrated pheromone system enhances the device's attractiveness, increasing its efficacy in attracting mosquitoes and reducing the overall mosquito population. Using state-of-the-art technology, the Mosquito Zapper ensures the swift and humane elimination of mosquitoes. Once trapped, the mosquitoes are exposed to a carefully controlled environment within the device, where they are quickly and safely neutralized. This approach not only reduces the nuisance and discomfort caused by mosquitoes but also plays a crucial role in disease prevention by interrupting the mosquito-borne transmission cycle. Furthermore, the Mosquito Zapper incorporates intelligent monitoring and data analysis capabilities. Real-time data, including mosquito population density, species distribution, and temporal patterns, can be collected and analyzed. This information empowers public health authorities with actionable insights, enabling targeted intervention strategies and the allocation of resources to high-risk areas. The implementation of the Mosquito Zapper represents a significant advancement in mosquito control and disease prevention efforts. By effectively reducing mosquito populations and interrupting disease transmission, this innovative device has the potential to save countless lives and alleviate the burden on healthcare systems in mosquito-prone regions.

Keywords:

Mosquito control, Disease prevention, Pheromone attraction, Public health, Mosquito-borne diseases.

INTEGRATED BEE HIVE FOR ENHANCED BEE VENOM COLLECTION: REVOLUTIONIZING APICULTURE FOR PHARMACEUTICAL ADVANCEMENTS AND ENTREPRENEURIAL OPPORTUNITIES.

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Abstract

Apicultural practices have long been centered on honey production, neglecting the immense potential of other valuable bee products, such as bee venom. Bee venom is a natural substance with various therapeutic components that are utilized in pharmaceuticals; For pain management, treatment of arthritis and management of Parkinsonism and Alzheimer's disease. To bridge this gap and harness the potential of bee venom, we have developed an innovative solution: The Integrated Bee Hive. This revolutionary bee hive incorporates venom simulation modules to facilitate the collection of bee venom alongside other apicultural products. The Integrated Bee Hive enables the controlled collection of bee venom without harming the bees. It utilizes specialized modules that simulate natural stimuli, triggering the bees to release venom in a safe and controlled manner. The venom is then carefully collected, ensuring purity and quality for pharmaceutical applications. Beyond bee venom, this integrated hive system efficiently gathers other bee products, such as honey, beeswax, propolis, and royal jelly. By incorporating multiple collection modules into a single hive, the Integrated Bee Hive optimizes the productivity and versatility of apicultural practices. The Integrated Bee Hive serves as a game-changer in apicultural practices, unlocking the potential of bee venom and expanding the scope of entrepreneurial opportunities. By integrating venom simulation modules and facilitating the collection of multiple bee products, this innovation paves the way for advancements in pharmaceutical research and development while driving the growth of sustainable and profitable apiculture ventures.

Keywords: *Integrated bee hive, bee venom collection, pharmaceutical advancements, entrepreneurial opportunities and therapeutic components.*

REVOLUTIONARY AUTOMATED RESUSCITATION MACHINE: ENHANCING PATIENT OUTCOMES THROUGH STANDARDIZED CHEST COMPRESSIONS AND RESCUE BREATHS

Innovation in Healthcare Delivery

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Abstract

Efficient and standardized cardiopulmonary resuscitation (CPR) is crucial for improving survival rates and patient outcomes during critical emergencies. However, human errors in delivering consistent chest compressions and rescue breaths pose significant challenges to achieving optimal resuscitation outcomes. To address this issue, we introduce a groundbreaking innovation: the Automated Resuscitation Machine (ARM). The ARM is a cutting-edge device designed to assist healthcare providers in delivering precise and standardized chest compressions and rescue breaths during CPR. Leveraging advanced sensor technology, real-time feedback mechanisms, and intelligent algorithms, the ARM ensures accurate compression depth, rate, and ventilation volumes while reducing the likelihood of provider fatigue and variability. By implementing the ARM, healthcare providers can focus on other critical aspects of patient care during resuscitation, such as medication administration and rhythm analysis, while maintaining

consistent and high-quality chest compressions and rescue breaths. The ARM's user-friendly interface, guided prompts, and customizable settings allow for seamless integration into existing resuscitation protocols, adapting to various patient sizes and clinical scenarios. In addition to enhancing resuscitation quality, the ARM captures and analyzes real-time data, providing valuable insights into resuscitation performance metrics. These metrics, including compression depth, ventilation volumes, and hands-off time, can be reviewed post-resuscitation to facilitate quality improvement initiatives, identify training needs, and promote evidence-based resuscitation practices. The introduction of the ARM revolutionizes CPR by minimizing human errors, ensuring standardization, and ultimately improving patient outcomes. By delivering consistent chest compressions and rescue breaths, the ARM mitigates the risk of inadequate resuscitation efforts, increasing the chances of survival and minimizing neurological sequelae.

Keywords:

Cardiopulmonary resuscitation, automated resuscitation machine, standardized chest compressions, rescue breaths, resuscitation quality improvement.

UNVEILING THE POWER OF NUTRITION: EXPLORING THE DIETARY PRACTICES OF ADULT PATIENTS DIAGNOSED WITH DIABETIC NEUROPATHY - A CROSS-SECTIONAL STUDY

Innovation Approaches in Preventive, Curative and Rehabilitative Health Care

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Abstract

Background: Diabetic neuropathy is a common complication of diabetes that can significantly impact patients' quality of life. Nutrition plays a crucial role in managing the condition and preventing further complications. This cross-sectional study examines the dietary practices, nutrient intake, and adherence to dietary recommendations among adult patients diagnosed with diabetic neuropathy.

Method: A sample of adult patients diagnosed with diabetic neuropathy was recruited from healthcare facilities. Data on dietary practices, including food choices, meal patterns, and dietary restrictions, were collected through structured interviews and food frequency questionnaires. Nutrient intake was assessed using dietary recall methods and analyzed using descriptive statistics. The chi-square test was used across the glycated hemoglobin (HbA1c) levels to compare categorical variables. Adherence to dietary recommendations was evaluated based on established guidelines for diabetic neuropathy management.

Result: Preliminary results indicate that many adult patients with diabetic neuropathy have suboptimal dietary practices. The findings revealed that among those who had one and two meals majority significantly reported elevated HbA1c [$\chi^2=11.808$, $p=0.008$]. Patients who skipped meals (breakfast and lunch) reported elevated HbA1c [$\chi^2=17.622$, $p=0.001$]. The majority of patients who reported being smokers and consuming alcohol had elevated HbA1c than their counterparts [$\chi^2=7.269$, $p=0.007$] and [$\chi^2=15.61$, $p<0.001$], respectively. Frequency of physical exercise was associated with low HbA1c; patients who reported doing exercise daily or 1-3 times a week significantly had low HbA1c [$\chi^2=37.329$, $p<0.001$]. A significantly higher proportion of patients were present with elevated HbA1c among patients who reported daily consuming animal products [$\chi^2=18.93$, $p<0.001$], fats and oils [$\chi^2=12.211$, $p=0.00$], fruits [$\chi^2=22.106$, $p<0.001$] and cereals and cereals products [$\chi^2=21.728$, $p<0.001$]. On the other hand, patients who consumed vegetables [$\chi^2=8.255$, $p=0.016$], pulses, and legumes [$\chi^2=53.757$, $p<0.001$] daily, significantly reported normal HbA1c levels meaning those who consumed vegetable pulses, and legumes daily were in a better position to control their HbA1c levels. However, the consumption of sugar and honey once in a while did not statistically significantly ($\chi^2=1.082$, $p=0.582$) affect the proportion of HbA1c levels.

Conclusion: Further research is warranted to explore the causality of the observed associations and the long-term effects of nutritional strategies on blood glucose control, neuropathic symptoms, and quality of life in this patient population.

Keywords: *Nutrition, dietary practices, diabetic neuropathy, nutrient intake, glycemic control, Glycated hemoglobin(HbA1c)*

RELATING URINARY TRACE ELEMENTS INFLUENCING CHILD AND MATERNAL HEALTH STATUS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS IN WESTERN KENYA.

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Abstract

Background: Child and maternal health in Western Kenya continues to be a pressing concern, with high rates of malnutrition, infant mortality, and maternal morbidity. This research study delves into the critical issue of trace element status in children and expectant mothers residing in Western Kenya, a region characterized by diverse environmental conditions and dietary practices. Trace elements play pivotal roles in the maintenance of child and maternal health, with deficiencies or excesses having significant implications for both populations. However, the accurate assessment of trace element status is often complicated by variations in hydration levels, particularly in resource-constrained settings.

Methods: A cross-sectional research design was employed, involving a representative sample of mothers and children in Western Kenya. Urine samples were collected and analyzed for trace elements, including Iodine (I), Molybdenum (Mo), Selenium (Se), Zinc (Zn), Arsenic (As), Cadmium (Cd), Tin (Sn), and Lead (Pb). Urinary hydration status was assessed using Urinary creatinine, Osmolality, and Specific gravity (SG). Data on maternal and child health indicators, such as nutritional status, birth outcomes, and overall health, were also collected.

Results: Preliminary findings reveal significant associations between urinary hydration status and the concentration of trace elements in both mothers and children $P < 0.0001$. Inadequate hydration was correlated with elevated levels of toxic elements and deficiencies in essential minerals, which may have adverse effects on child and maternal health. Mo, Se, As, Cd, and Pb indicated a significant positive correlation between urinary osmolality and specific gravity in uncorrected and corrected concentrations of the elements $p < 0.001$. No significant correlation was shown between urinary osmolality and specific gravity in I, Zn, and Sn with rank correlation coefficients $R = 0.01, 0.16, \text{ and } 0.06$, in that order. After corrected concentration, I, Mo, Zn, As, Cd, Sn, and Pb urinary specific gravity exhibited a high negative correlation with urinary creatinine with negative correlation coefficients $R = -0.63, -0.4, -0.59, -0.41, -0.23, -0.59, \text{ and } -0.83$ correspondingly. Maternal health indicators, such as Hemoglobin, and age were also linked to hydration status and trace element levels.

Conclusion: This study underscores the importance of considering urinary hydration correction in the assessment of trace element levels in child and maternal health studies. Addressing inadequate hydration may be a crucial step in improving the nutritional and overall health status of mothers and children in Western Kenya.

STATUS OF MENTAL HEALTH POLICY IMPLEMENTATION IN KISUMU, KAKAMEGA, VIHIGA AND BUNGOMA COUNTIES, KENYA

Sub-Theme: Innovation Approaches in Preventive, Curative and Rehabilitative Health Care

Authors: Odanga, Sylvester J Otieno, Otieno, Roy D. Onyango & Juma, Dorothy

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Abstract

The capacity of the County Governments to adequately carry out mental health services for the implementation of the Kenya Mental Health Policy 2015 – 2030 has been wanting. Therefore, this study sought to determine the status of Mental Health Policy implementation in Kisumu, Kakamega, Vihiga and Bungoma Counties of Kenya. Stratified random sampling was used to select a total of 50 health facilities and 326 respondents from the four counties. Data was collected using questionnaires, interview schedules and document analysis guides and was analyzed using descriptive statistics and thematic analysis for quantitative data and qualitative data respectively. The findings revealed that less than a third of the respondents from households with lived experience of mental illness were able to mention the name of the mental disorder their family member is suffering from. Almost three-quarters of the respondents indicated that the initial care of the mentally ill should be at the community level. The study also found out that challenges faced by the mentally ill included financial constraints, discrimination and inability to access essential drugs. The study also found out that there were very low levels of frontline staff. The study concluded that the status of the implementation of the Kenya Mental Health Policy was not adequate. It recommended the development of a clear roadmap for mental health at county level and national level and the development and financing of a costed mental health strategic plan. It also recommended the establishment and strengthening of County Mental Health Secretariat and training of Community Health Volunteers (CHVs) in mental health promotion, case finding, referral, follow up and adherence. In addition, it also recommended that counties need to invest in and promote community psychiatry services to decongest psychiatric units and establish community psychosocial support services to enhance community based mental health care.

Key Words: Mental Health, Kenya Mental Health Policy, County Government

INSECTICIDAL EFFICACY OF METHANOL AND HEXANE CRUDE EXTRACTS OF *Urtica Massaiica* Mildbr (Family: *Urticaceae*) PLANT PART EXTRACTS AGAINST IMMATURE STAGES OF *ANOPHELES GAMBIAE* GILES (DIPTERA: CULICIDAE) MOSQUITOES

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Abstract

Plant extracts are targets for greens insecticides and alternatives to synthetic insecticides. In this study, the lethal effect (LC₅₀ and LC₉₀) of crude methanol and hexane extracts of Stinging nettle (*Urtica massaica*) leaves, roots and stems were evaluated as insecticides against immature stages of *Anopheles gambiae* under laboratory conditions. 80gms of the extracts was dissolved in DMSO, topped to 200mls with distilled water and serially diluted to concentrations of 80, 40, 20, 10, 5, 2.5 ml/100mls (e/w). 10 immature *An. gambiae* were then exposed to each dose in a completely randomized informal after-only with control experimental design. The set ups were replicated four times. All set ups were left to stand overnight except for eggs that were left for 48 hours. Mortality was accessed and recorded after the said periods and

thereafter the experiments terminated. Solvent, dose and plant parts were taken as independent and mortality as dependent variables respectively. Extracts of methanol were more lethal than hexane while leaf extracts were more lethal [(Leaves, 4.86; stem, 4.56; roots, 11.91) for eggs, (Leaves, 1.86; stem, -; roots, 3.06) for L3s and (Leaves, 5.22; stem, 6.12; roots, 12.46)] and stem [(Leaves, 103.30; stem, 7.81; roots, 6.89) for eggs, (Leaves, 8.53; stem, 3.88; roots, 1.05) for L3s and (Leaves, 70.05; stem, 4.94; roots, 31.34) for pupae] for LC₅₀ than those of other parts as doses required were small irrespective of exposed aquatic stage. However, in all cases, calculated goodness of fit determined by χ^2 were more than the χ^2 critical value of 22.4 (df = 22; p < 0.05) and therefore the hypothesis of no relationship (H₀) between dose and mortality was rejected for the exposed stages. It is concluded that *U. massaica* plant part extracts are lethal against all immature stages of *An. gambiae* mosquitoes under laboratory conditions.

Key Words: *Urtica massaica*, Methanol, Hexane, Lethal effect, *Anopheles gambiae*

PREDICTORS ASSOCIATED WITH DOUBLE BURDEN OF MALNUTRITION AMONG CHILD-MOTHER PAIRS IN KERICHO COUNTY. INNOVATIVE APPROACHES IN PREVENTIVE, CURATIVE AND REHABILITATIVE HEALTHCARE.

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Abstract: Double burden of malnutrition is a global emerging problem in the LMICs. The coexistence of an underweight child with an overweight mother within the same household is a new occurrence as both shares a common environment and has access to the same feeding habits and patterns. The aim of this study was to investigate the predictors associated with double burden of malnutrition among the child-mother pairs living in Kericho County. The study design was cross-sectional descriptive, comprising of a child-mother pairs living within the 6 sub-counties in Kericho County and utilized the multi-stage stratified cluster sampling method to get to the target households. A pre-tested questionnaire was used for data such as: socioeconomic demographic characteristics, nutrition status for mother (Body Mass Index,) child (BMI- Z-scores), food consumption and frequency. Data entry, coding and analysis were done using Ms Excel, SPSS vs. 26.0 and Nutri survey 2005 software. Categorical variables were analyzed, while measures of central tendencies and dispersion used. n=346, P value = p<0.05. The results were presented by tables and showed that majority of the respondents 57.6% were aged 36 and 49 years. The study findings revealed 18.9% of children were stunted, 11.5% wasted, 5.8% obese and 8.1% overweight. The study found that 28.1% of mothers were overweight, 7.7% were obese and 16.9% were underweight. The variables: Weight of; mother's age, weight and height, child's age, gender and weight were significantly associated with double burden of malnutrition among child-mother pairs. The most consumed typed of food was; ugali, vegetables and milk. The mother's weight, height and age, the child's weight, age and gender influences the nutritional outcomes which has an influence in controlling DBM. The study recommends that policy makers to review the Maternal, Infant and Young Child Nutrition policy to take into consideration the double burden of malnutrition.

Keywords : Double burden, Malnutrition

MENTAL HEALTH AMONG THE RURAL POOR COMMUNITIES IN KENYA AN INVESTIGATION OF TWO PRIMARY FACILITIES IN SOUTH RIFT

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Abstract:

The global burden of disease related to mental disorders is on the increase, with the World Health Organization (WHO) estimating that over 450 million people are affected worldwide. In Kenya the Kenyan National Commission of Human Rights estimates that 25% and 40% of outpatients and inpatients suffer from mental health conditions. This is believed to be due to depression, substance abuse, stress, and anxiety disorders. Most of the patients prefer to visit traditional healers, religious leaders before considering skilled facility care as the last option. Although communication campaigns for mental health have been going on in Kenya over the years, studies indicate that knowledge levels are still low and stigma is widespread. This study

intends to investigate communication strategies on mental health for behavior change among the rural population. This study has the following objectives: to evaluate the levels of mental health knowledge among the rural population, to assess the effectiveness of the communication campaigns conducted for mental health and to examine the use of new media for the dissemination of mental health knowledge. The target population of this study will be health care providers and patients from selected facilities in south rift, selected traditional healers and religious leaders. Qualitative data will be collected from the participants. This data will be analyzed thematically and presented in narrative form.

Keywords (maximum 5) *mental disorder, mental health*

MATHEMATICAL MODEL FOR THE EFFECTS OF PHYSICAL ACTIVITY AND NUTRITION RATES IN PATIENTS WITH DIABETES MELLITUS

Health Sciences

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Abstract

The scourge of diabetes is ravaging the country's population affecting the lives of many people mainly the economically active groups. Its effects result in a decrease in the output of the country's labor force and consequently reducing the Gross Domestic Product (GDP). This has been compounded by a rapid increase in the prevalence of risk factors for diabetes and other chronic non-communicable diseases. If the disease is not well managed, it will hinder the attainment of the Sustainable Development Goals (SDGs), realization of the vision 2030 and Africa Development Agenda 2063. For Diabetes mellitus patients to achieve a promising result there is need for continuing medical care and ongoing patient self-management education and support, to prevent acute complications and to reduce the risk of long-term complications resulting from the disease. The care of Diabetes mellitus patients is complex and requires that many problems, beyond glycemic control be addressed. A large body of evidence exists that supports a range of interventions to improve the management of Diabetes mellitus. Several previous models have been used to solve the problem to acquire the minimal time within the range to correct the glucose level but none of the previous models considered the rate at which nutrition and physical activity are being varied. The objective of this study was to develop a mathematical model for Blood Glucose Regulatory System (BGRS) using Differential Equations. This model incorporated nutrition and physical activity, to be able to manage Diabetes mellitus in such a way that, the peak, which is the time period for insulin to be most effective in lowering blood sugar, is within the acceptable range. Secondary data collected from Mathematical Model for Drug Therapy in Patients with Diabetes Mellitus paper was used to establish the reliability of the model. The concept of qualitative theory of differential equations for equilibrium solutions and stability was used. A computer code was used to determine the equilibrium solutions and eigenvalues of the coefficient matrix. The model was analyzed and the solution helped in determining the effects of external rates in patients with Diabetes mellitus. It is worth noting that after doing physical activity for some minutes, we have that the glucose and insulin levels in the blood plasma of diabetic patient decreases back to their normal level. This means that if a patient observes the correct diet and does physical activity regularly and

mostly once per day for a certain period, there is no need of going for any insulin supplement. This is more beneficial because introduction of insulin from external source into the body with time may become resistant.

Keywords: *Physical activity, Nutrition, Diabetes mellitus, Blood Glucose Regulatory System.*

SMART DUSTBIN INNOVATION: ADVANCING INFECTION PREVENTION THROUGH AUTOMATED LID OPERATION AND WASTE STERILIZATION.

Innovation in Healthcare and Environmental Hygiene

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The conventional dustbins used in our homes and workplaces often present challenges in terms of hygiene and infection prevention, especially in medical settings. The handling of contaminated dustbin lids by healthcare professionals poses a significant risk of infection transmission. To address this concern, we introduce an innovative solution: The Smart Dustbin. The Smart Dustbin is equipped with an intelligent lid system that operates automatically, eliminating the need for manual lid handling. By incorporating proximity sensors and motion detection technology, the lid opens and closes seamlessly, ensuring touchless operation and minimizing the risk of contamination. This feature is especially crucial in medical environments, where infection prevention is of paramount importance. The Smart Dustbin incorporates advanced sensing mechanisms to monitor its fill level. When the dustbin reaches its full capacity, the system sends real-time notifications to public health authorities, enabling prompt waste collection and disposal. This ensures efficient waste management and prevents overflow, reducing the risk of environmental contamination and associated health hazards. Furthermore, the Smart Dustbin employs UV lights to sterilize the waste inside. The UV light module is activated periodically or upon lid closure, effectively reducing the number of microorganisms present in the bin. This innovative feature significantly contributes to infection prevention measures in hospitals, homes, and workplaces, creating safer and healthier environments for all occupants. By revolutionizing dustbin technology, the Smart Dustbin promotes infection prevention and environmental hygiene. The automated lid operation, waste level monitoring, and UV sterilization capabilities reduce the risk of contamination, enhance waste management efficiency, and protect the health of individuals in various settings.

Keywords: *Smart dustbin, infection prevention, automated lid operation, waste sterilization, environmental hygiene.*

INVESTIGATING THE SPATIAL AND TEMPORAL VARIABILITY OF FLAVONOLS IN SELECTED KENYAN LEAFY VEGETABLES INNOVATION APPROACHES IN PREVENTIVE, CURATIVE AND REHABILITATIVE HEALTH CARE

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Abstract

Leafy vegetables rich in polyphenolic compounds with strong antioxidant activities form an integral part of many household diets in Kenya. Quercetin and kaempferol are antioxidative flavonols found in these vegetables known to combat free radicals associated with various ailments including cancers in humans. In this study, two indigenous vegetables, *Solanum nigrum* (black night shade) and *Gynandropsis gynandra* (spider plant), and two exotic vegetables, *Brassica oleracea* C. (Cabbage) and *Brassica oleracea* A. (Kale) were investigated with the aim of determining their quercetin and kaempferol contents. Effect of spatial and temporal variability on these parameters were also studied. Fresh leaves of the four vegetables were randomly sampled in both the dry and wet seasons from four sites in Uasin Gishu County, namely Burnt Forest (BF), Elgeyo Border (EB), Kapseret (KSS), Kesses (KS) and Moiben (MB). After air-drying, the samples were pulverized and the flavonols extracted using methanol followed by instrumental analysis by high performance liquid chromatography (HPLC). The amounts of quercetin and kaempferol in *Solanum nigrum* were 1063.3 ± 9.6 mgkg⁻¹ dw and 559.8 ± 17.4 mgkg⁻¹ dw, respectively, while *Gynandropsis gynandra* registered concentrations of quercetin and kaempferol of 896.5 ± 11.3 mgkg⁻¹ dw and 517.6 ± 10.1 mgkg⁻¹ dw, respectively. Significantly, the indigenous vegetables showed a threefold increase in the flavonol amounts than their exotic counterparts. It was observed that the flavonol levels were more in the samples obtained during the dry season than those from the wet season. This seasonal variance was attributed to the prevailing adverse climatic conditions in the dry season that affect their synthesis and accumulation by plants. Spatial variability of the analytes was also consistent with the agroclimatic conditions prevailing in the sample sites. The findings of this study, therefore, provide some important insights on the antioxidant potential of the two indigenous vegetables as affected by spatial and seasonal variability.

Keywords Flavonols, quercetin, kaempferol, leafy vegetables and Antioxidant Activities

COMMUNITY INVOLVEMENT APPROACHES TO COVID-19 INFECTION, PREVENTION AND CONTROL IN LODWAR TOWN, TURKANA COUNTY, KENYA

By

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Abstract

Communities get involved in emerging issues all over the world by employing different approaches. Therefore, communities in Lodwar town got involved in Covid-19 infection, prevention and control. The problem individuals in the community were scared of infection, which posed a challenge to prevention and control measures or approaches which were put in place to prevent and control infections. The objectives of research are: to examine the effects of Covid-19 on the communities in Lodwar town; to explore the strategies put forward by stakeholders to control the spread; and to determine the challenges posed by Covid-19 as communities need to prevent the spread. The study applied descriptive research design because it is a method of collecting information by administering to a sample of individuals. The research adopted non-probability purposive random sampling to determine the size for the study and questionnaires and interview schedule were used as data collection tools from the seven research sites in Lodwar town. The findings indicate Chi-square Test for the relationship between community involvement in Covid infection, prevention and control in Lodwar Town; χ^2 , (24, N=335), $P < .05$, a significant proportion of respondents agreed that covid-19 infection had a negative impact on prevention and control because everybody was in fear. From the discussion of the research findings, it is concluded Covid-19 became dangerous not only to community individuals involvement but also to the medical officers. Whether it is related to prevention and control, vaccine testing and ethics or resilience and recovery, community

engagement can support successful efforts. It is recommended for the community involvement to prevent covid-19, the following approaches should be appropriately applied: Individual personal health and hygiene; Frequent hand washing with detergent; mouth or nose covering when coughing or sneezing using masks; Face masks to prevent further transmissions; Always sanitizing practices to prevent spreads through both airborne and contact with contaminated surfaces.

Key words: *Community involvement, Control, Covid-19, Infection, Control.*

COMMERCIALIZATION OF UNIVERSITY RESEARCH IN AFRICA FOR ADDRESSING FOOD SECURITY AND SOLID WASTE MANAGEMENT CHALLENGES

Sub-Theme: Commercialization of Research and Technology

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Abstract

This presentation explores the vital role of universities in addressing major challenges in Africa: food security and solid waste management. It delves into the potential of university research to develop innovative solutions for these issues, emphasizing commercialization strategies as a means to drive sustainable development. By examining ongoing research activities and successful case studies, the presentation underscores the transformative power of university-led initiatives in revolutionizing agricultural practices and waste management strategies. It also highlights the importance of cross-disciplinary collaboration in creating comprehensive solutions that benefit both the environment and society. As universities become key players in commercializing research outcomes, they contribute significantly to the alleviation of food insecurity and waste management challenges, paving the way for a brighter and more sustainable future in Africa.

Keywords: *Commercialization of University Research, Africa, Food Security, Solid Waste Management, Sustainable Development*

COMMERCIALIZATION OF INNOVATIVE RESEARCH: A CASE STUDY OF KENYAN UNIVERSITIES.

Sub-Theme: Commercialization of Research and Technology

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Abstract

Research-commercialization is a crucial aspect of technological innovation and is a complex Socio-economic and technological process. It prepares researchers and innovators to transition their research output to commercial value and possibly to scalable businesses. It's an action-oriented training and coaching programme that provides researchers and innovators an opportunity to commercialize and achieve a good problem-solution fit as well as technology-market fit. Commercialization provides an opportunity to engage with industry partners, investors and other businesses. These partnerships can result in additional funding sources to further University research. There is growing evidence that the pressure to commercialize is directly or indirectly associated with adverse impacts on the research environment, science hype, premature implementation or translation of research results, loss of public trust in the university research enterprise, research policy conflicts and dwindling funds that universities continue to receive from the exchequer. This paper explores the commercialization of university research, through literature review and library research on the development of research commercialization by Kenyan universities. The study addresses three main research questions: (i) what are the recent major policy changes affecting the commercialization of university research in Kenya? (ii) How much have Kenyan universities done in research commercialization over the past few years? (iii) What are the benefits of research commercialization (iv) What are the key barriers to the achievement of higher levels of commercialization in university research? The findings of this study show that there are two fundamental issues that universities have to address: (i) adequate financial support from governments, industries, and other stakeholders; and (ii) effective innovation management with academic entrepreneurship. Because the issues and problems covered in this study are common to many countries, the study has international

applications and provides policymakers and practitioners with valuable information to assist them in the development of organizational strategies in the commercialization of innovative university research.

Key words: Research, innovation, commercialization, Kenyan universities

**TECHNO-ECONOMIC ANALYSIS OF NON-CARBONIZED BRIQUETTES FROM PROSOPIS JULIFLORA WITH BINARY COMBINATION OF MAIZE COBS AND BAGASSE AGRICULTURAL WASTE
(Sub-Theme: Research and Technology Commercialization)**

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Abstract

This study conducted a techno-economic analysis of non-carbonized briquettes from *Prosopis juliflora* with binary combination of Maize Cobs and Bagasse Agricultural Waste. The briquettes under this study were produced from the invasive *Prosopis juliflora* with binary combination of bagasse and maize cobs in percentages of 25 and 50 of the total sample weights respectively. The feedstock materials were carefully collected and processed, and the briquetting process was performed using a piston-type machine at high pressure. The study evaluated the economic viability of the process, considering installation and operating costs. The resulting briquettes showed promising quality and energy potential by attaining calorific value of 19.73MJ/kg at 50% maize cobs binary combination which was chosen to be the optimal fuel combination. The piston type technology used in this study showed to be viable having attained a positive IRR of 55% against a discounting rate of 13% plus having a positive NPV of Kshs. 7,863,216. Further, the resulting briquettes of *Prosopis juliflora* 50% and Maize cobs 50% binary combination proved cheaper in comparison to LPG, Eucalyptus firewood and charcoal briquettes retailing comparatively at Kshs. 13.97 with respect to Kshs. 225.00, 19.71 and 18.31 for LPG, Eucalyptus firewood and charcoal briquettes respectively on providing an equal amount of 46 MJ/kg. The application of the piston type briquetting technology that seeks to utilize *Prosopis juliflora* and maize cobs as feedstock for bioenergy production is a breakthrough in clean energy development in Kenya and providing a sustainable solution on managing the invasive *Prosopis juliflora* plus disposing agricultural waste on a more economical manner.

Key Words: Briquettes, *Prosopis juliflora*, Calorific value, Techno-economic analysis

**TRANSFORMING RESEARCH KNOWLEDGE TO COMMERCIALIZATION ECONOMY AT THE UNIVERSITY OF KABIANGA
Authored by**

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Abstract.

Research to commercialization (R2C) is a concept that is gaining traction in research institutions as well as Universities in Kenya. In a scenario of reduced exchequer grants and little donor support to these institutions, novel ways are being explored to ensure that alternative revenue streams are generated to support the activities of these institutions. Research output is one such area that has the potential to unlock the potential through commercialization. University of Kabianga is now at the centre of the knowledge economy where researchers are expected to research and innovate with an aim of commercializing the outputs of such research. Findings from situational analysis of the institution showed several factors that are indicative of readiness of the institution to jump into the era of commercialization. They are: institutional policies, namely; the Research Policy, the Linkages and Collaborations Policy, the Consultancy Policy and the Intellectual Property Rights Policy; high number of staffs with PhDs and Masters, high number of publications generated by staff, undergraduate and graduate programs; supportive management; student innovation clubs, school (faculty) innovation champions, incubation centre and technology transfer office. Therefore, University of Kabianga is at the centre of the knowledge economy where expectations are ripe for innovation and transforming the innovations to commercializable products. This will increase the University competitiveness, generate more funds for more innovations, generate startups, and contribute to economic growth, alongside creating more job opportunities. The study recommends increased efforts to sensitize staff and students on commercialization and intellectual property rights (IPR) to be able to move beyond the publications and conference presentation stages and commercialize their research outputs/results.

Key words: *innovation, research, commercialization, policies.*

EVALUATING DIGITAL INNOVATIONS AND EMERGING TECHNOLOGIES FOR CONSULTATIVE TRAINING DELIVERY THROUGH VIRTUAL LEARNING ENVIRONMENT (VLE)

RESEARCH AND TECHNOLOGY COMMERCIALIZATION

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Abstract

New technologies offer powerful tools for implementing innovative pedagogical methods in educational settings, integrating them in a relaxed setting still remains a challenge. Assessments of virtual learning environments (VLEs) often rely on feature checklists and narrow indicators thus unable to capture the dynamic interconnected nature of a virtual classroom. Due to their size, complexity, and enormous budgetary allocation, VLEs are more welcomed and used at the institutional level, with any subsequent evaluation, if any, being performed at the institutional level rather than at the level of the individual learner. Since they are intermediate between the micro and macro perspectives, the programmatic or disciplinary levels, which are often accurately described as a distinct "community of practice," are often overlooked. Virtual reality and cutting-edge technology are revolutionizing the way we interact with; electronic gadgets, transforming classrooms and addressing problems through problem-solving. Wenger's theory of communities of practice and Technology Acceptance Model (TAM) provide the theoretical foundation for this research. This research will look into the prevalence of VLEs in Kenyan Government Training Institutions with the aim of facilitating professional development. This study uses both descriptive and inferential statistics to examine survey responses from 200 students enrolled at the Kenya School of Government's Baringo. These results are crucial in bridging the gap between theoretical pedagogy and practical resources. Considering the interplay between individual components is essential for maximizing the potential of a VLE. The study begins with a theoretical grounding, continues on to the development of an assessment instrument, then assesses the instrument's reliability and validity in the actual world, and concludes with recommendations for its application. In this article, I focus on the use of VLEs to provide consulting training as well as the analysis of digital innovations and new technologies.

Keywords

Virtual Learning Environments (VLEs), Virtual Reality (VR), Cutting-edge Technology, Technology Acceptance Model (TAM)

THE PORTRAIT OF ANIMALS AS HUMANS AND HUMANS AS ANIMALS OR OBJECTS IN SOME SELECTED WESTERN KENYAN MUSICAL TRACKS AS A BASIS FOR TECHNOLOGICAL DEVELOPMENT

CULTURE AND TECHNOLOGY

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Abstract

It is theorized that art is the foundation of Science and Technology. This study examines *African Twist* by Daudi Kabaka and *Thum Joka Lee* by Paul Orwa, then analyses how the two have employed diverse forms of imitation or mimesis in depicting the interplay between animals, plants and human beings. The scientists could adopt the same creative imagination as technological methodology for solving environmental problems. It will show how cultural heritage could be fused with contemporary innovation and enrich it. This will be a library research done by playing and transcribing the two tracks, then translating them after which the product will be discussed. For the benefit of readers, the original language of compositions in print and audio forms will be attached as appendix at the end. It will take an anthropological cultural perspectives emanating from the tracks and later use the interdisciplinarity to suggest how technology could depend on art and vice-versa. The dominant written culture which is the container of technology, is depicted as a beneficiary of oral narratives and that, it has been used to solve many human and environmental problems, therefore should continue to inform our endeavours to solve global warming and desertification. It is what the musical artists do promote in society without being conscious of it. The paper will be an expose of the same, reflecting the inherent link between technology and culture. Researchers often see how technology changes cultural traditions worldwide, but fail to recognise how culture motivates scientific engineering and revolution that is sustainable.

Keywords *Mutation, Transformation, Anthropomorphism, Transmogrification and Mimesis.*

NUMERICAL INVESTIGATION OF OPTION PRICING USING BLACK-SCHOLES-MERTON PARTIAL DIFFERENTIAL EQUATION WITH NON-CONSTANT VOLATILITY AND TRANSACTION COST

Innovation and practices in Science, Technology, Engineering and Mathematics for sustainable development

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Abstract

Over the years studies have been done on option pricing valuation. The world market economies have experienced tremendous asset price fluctuations since 1980s. For this reason, efforts have been directed towards developing reliable and more accurate option pricing models due to volatility and unpredictable market forces. Black-Scholes-Merton model has so far been proved to be the most powerful and significant tool for the valuation of an option. To achieve reliable and accurate price estimates, this study investigated

the effects of transaction cost and non-constant volatility on call and put option of an asset price using a two-dimensional Black-Scholes-Merton partial differential equation. Finite Difference Method was used to solve the Black-Scholes model equation describing the value of an option with the boundary conditions with the aid of MATLAB software program. The Dufort-Frankel numerical scheme was developed for the model equation. The effects of incorporating transaction cost and non-constant volatility on the two assets prices on the value of an option using BSMPDE were determined. It was established that as the volatility increases, the call and put option values also increase. Further, the study established that as transaction cost increases, the call and put option values decrease. The effects of incorporating transaction cost and non-constant volatility on the values of call and put option were shown in tabular form and graphically. These results will be useful to the investors in computing possible returns on investment based on more accurate asset pricing and to the government on policy formulation in controlling prices in stock exchange market.

Keywords: Option value, volatility, transaction cost, Black-Scholes model

ON MONOTONE PROPERTIES OF $\mu_{|f|^p}^{(i-1,i)}$ - MEASURABLE SETS INNOVATION AND PRACTICES IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) FOR SUSTAINABLE DEVELOPMENT

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Abstract

Many studies have been done on p -integrable functions. In previous studies, mathematics scholars worked on p -integrable functions where $p > 1$ and the conjugate real number p' satisfying the equation $\frac{1}{p} + \frac{1}{p'} = 1$. Many researchers considered p -integrable functions with values in a Banach space. However, no studies have been done on the measurability of sets with respect to p -integrable functions generated vector measures. This research therefore considers $\mu_{|f|^p}^{(i-1,i)}$ - vector measurable sets with values in Hilbert space. A sequence of p -integrable monotonically increasing and decreasing functions and utility concepts of vector measure duality are applied in constructing $\mu_{|f|^p}^{(i-1,i)}$ - vector measurable sets with respect to a sigma ring $\rho^{(i-1,i)}$ of an n -dimensional space. The k_{i+1} - projection properties of a vector measure for any fixed positive integer k_{i+1} where $i = 1, 2, \dots, n$ are applied to determine the measurability of regular geometric structures (or models) constructed from an n -dimensional measure space. The results of this study will be of practical utility in the Construction industry and to applied aspects of Engineering

Keywords: p -integrable functions, Measurable set, Monotone

GENERATION OF CYCLIC CODES OVER GALOIS FIELD (29)

Sub-Theme: Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development

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Abstract

Studies in coding theory have been done for decades with an objective of improving communications over unreliable channels so as to minimize errors in the transmitted data which is relayed in form of codes. ECC's are used to rectify errors when data is transmitted over irregular communication medium.

Communication medium may be a telephone network, a high frequency radio channel or a satellite communication channel. Transmission of information involves encoding process which is the addition of a certain amount of excess data so that the original information can be recovered. In multinomial terms it is the process of converting a message multinomial to a valid code multinomial. ECC's were introduced by Shannon in order to address the rising demand for efficient and reliable transmission of data. Many fields such as data repository, communication systems and error-detection and correction mainly use cyclic linear codes because they possess substantial algebraic characteristics and have systematic algorithms for encoding and decoding. This study will carry out factorization of cyclotomic polynomial $(w^m - 1)$ over GF (p) where p is prime. This research proposes to generate irreducible monic polynomials of $(w^m - 1)$ over GF (29). The study involves partitioning of the cyclotomic polynomial $(w^m - 1)$ into distinct cosets using cyclotomic cosets of 29 modulo m and consequently determine cyclic codes over GF (29). The results obtained will be presented in form of tables, analyzed and discussed. The results will contribute to existing knowledge in coding theory and its vast application in communication, computer science and information technology.

Keywords: *Galois field, Cyclotomic multinomial, cyclic codes, Coding*

MATHEMATICAL MODEL OF SOLID WASTE MANAGEMENT IN NYAMIRA MUNICIPALITY USING FUZZY GOAL PROGRAMMING

STEM

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Abstract

Waste in urban areas is growing rapidly everywhere in the world. Effective methods to address challenges of solid waste management are critical in achieving an environment that is clean and healthy. The problem of waste growth in urban areas has been brought about by low collection of waste, illegal and uncontrolled dumping sites and the absence of sewage lines. In Kenya for instance the growth of economy which resulted in the development of cities and emergence of towns led to waste management challenges. Efforts have been directed towards addressing the problem of waste management by various county governments. This study seeks to address solid waste disposal and management challenges in Nyamira Municipality. The methods currently being employed to address these challenge is costly and have not yielded desirable results as is evident with the scattered waste in the streets of Nyamira Municipality. This Study will formulate solid waste management tool that will involve constructing a fuzzy goal programming model. The model will be solved analytically by simplex method. Numerical simulation and sensitivity analysis will be carried out using MATLAB software. The utility of the model will be tested using data from Nyamira municipality. The research is advocating for waste recycling as one of the ways of managing waste so as to earn revenue from these recycled waste. Once completed, the findings of this study will be useful in formulating policies on setting up of waste management projects and establishment of recycling industries. Furthermore the findings will form the basis for future research in related fields.

Keywords, *Solid waste, fuzzy goal programming, simplex*

SOLAR ENERGY-DRIVEN WATER DISINFECTION WITH PHOTOCATALYTIC AND PHOTOTHERMAL SCIENCE

Sub-theme: Innovation and practices in science, technology, engineering and mathematics for sustainable development

The escalating global demand for clean and potable water calls for innovative and eco-friendly water disinfection methods. The utilization of solar energy, coupled with advanced nanomaterials, presents a promising solution for achieving efficient and sustainable water disinfection. This research delved into the novel application of photocatalytic and photothermal nanomaterials in harnessing solar energy for water disinfection. Photocatalytic nanomaterials possess the unique ability to initiate chemical reactions under light irradiation, which can lead to the generation of reactive oxygen species (ROS) capable of disinfecting waterborne pathogens. Notable photocatalysts such as titanium dioxide (TiO₂), zinc oxide (ZnO) have demonstrated remarkable disinfection capabilities. When exposed to solar radiation, these nanomaterials can effectively eliminate a broad spectrum of microorganisms, including bacteria, viruses, and protozoa, without the need for chemical additives. Furthermore, photothermal nanomaterials exhibit the property of converting solar radiation into localized heat, leading to targeted pathogen inactivation. Nanomaterials like graphene, carbon nanotubes, and gold nanoparticles possess strong light-absorbing capacities, enabling rapid and efficient photothermal disinfection. This approach ensures selective pathogen eradication while minimizing damage to essential water constituents and preserving water quality. Combining photocatalytic and photothermal nanomaterials in a single system allows for synergistic effects, enhancing overall disinfection efficiency and reducing the required solar energy input. Solar energy-driven water disinfection utilizing nanomaterial advantages include; sustainability, low operational costs, and environmental friendliness. However, challenges such as nanomaterial stability, recyclability, and potential toxicity, must be addressed to ensure the safe and practical implementation of this technology. In conclusion, harnessing solar energy for water disinfection through the incorporation of photocatalytic and photothermal nanomaterials represents a promising avenue for mitigating waterborne diseases and promoting access to safe drinking water.

Keywords; photocatalytic, photothermal, nanomaterials, Solar

NATURAL RADIOACTIVITY LEVELS IN ROCKS EXCAVATED FROM KERICHO COUNTY QUARRIES, KENYA

Innovation and Practices In Science, Technology, Engineering and Mathematics (Stem) For Sustainable Development

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Abstract

The presence of naturally-occurring radionuclides such as Thorium-232, Uranium-238 (Radium-226) and Potassium-40 found in soil, water, rocks and food expose humans to ionizing radiations. These radiations are harmful to human beings and may result to lung cancer, leukemia, mutagenesis, kidney damage and even death if the radiation doses are higher. Samples were collected, crushed, oven dried (105 °C), weighed and stored for four weeks. Gamma spectrometry was used to quantify the activity concentrations of the natural radionuclides ²³⁸U (²²⁶Ra), ²³²Th, and ⁴⁰K in quarry rock samples. Additionally, evaluations of the radiological risks posed by these natural radionuclides were done. ²²⁶Ra, ²³²Th, and ⁴⁰K were all found to have average activity concentrations of 56 ± 2.81 Bq/kg, 101 ± 5.08 Bq/kg and 1100 ± 55.03 Bq/kg respectively. The average calculated absorbed dose rate was 138 ± 6.94 nGy/h, which was higher than the permissible level of 60 nGy/h but below the exemption threshold level of 1500 nGy/h

recommended by ICRP. The annual indoor and outdoor effective dose were 0.6 ± 0.03 mSv/y and 0.1 ± 0 mSv/y on average respectively, but still both were lower than the permissible value of 1 mSv/y. The acquired results demonstrate that there are no substantial radioactive risks to the residents of the research region and the persons in constant interaction with the excavated quarry rocks that are used in the construction of buildings.

PREY-PREDATOR MODEL ON THE INTERACTION OF PATHOGENIC BACTERIA AND BACTERIOPHAGES IN PRESENCE OF MEDICATION

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Abstract

Prey-predator models have been studied to demonstrate ecological interactions between prey and predators. These models have been used basically to show population dynamics of the species with ecological changes in the environment. Efforts have been directed towards treatment of bacterial infections with minimal success due to bacterial resistance to conventional medicine. Based on this limitation, this study seeks to develop a three-species model with two predators (Bacteriophages and medication) and one prey (Pathogenic bacteria). The main aim of the findings is to provide a suitable alternative for the clinical treatment of bacterial infections using antibiotics. The model developed factors in how the predators function mutually to attack the prey and shall be formulated by the use of delay differential equations. The time delay accounts for the time of action by both bacteriophages and medication until the time of recovery. The model has three variables and the local stability analysis will be analysed using Jacobian matrix by finding equilibrium points. Global stability will be determined by use of Lypunov function from the model. Numerical simulation shall be done using MATLAB to visualize the various effects of parameters in the model. The results of this study shall be used in development of guidelines and policies on management and treatment of bacterial infections. This will also contribute to the existing knowledge on bacterial infection treatment.

Keywords; Prey-predator, Bacteriophages, Pathogenic bacteria, Antibiotics.

SMART GRID METER READING APPLICATION UTILIZING THE ALL-OPTICAL WAVELENGTH REUSE TECHNIQUE Innovation and Practices in Science, Technology, Engineering and Mathematics for Sustainable Development

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Abstract

The experiment utilizes the all-optical wavelength reuse for the achievement of a cheaper meter reading approach for smart grid application. This all- optical wavelength reuse approach is demonstrated with the exploitation of a holding beam and the erbium doped fiber's (EDFA) gain saturation. The demonstration of wavelength re-use technique is done using a distributed feedback (DFB) laser that gave an output power

of 7.98 dBm after its bias current was set at 94.4 mA and was operated with a temperature stabilizer thermoelectric cooler (TEC). A 10 Gb/s data is used to modulate the DFB laser and is transmitted downstream over 50 km. The saturated EDFA lowered the downstream data's extinction ratio (ER) from 9.678 dB to 0.702 dB which is significant for both wavelength reuse and data rewrite for upstream transmission. The performance analysis for upstream and downstream transmission is done, the receiver sensitivity is measured at the BER 10^{-9} threshold and the corresponding incident powers determined. Additionally, the respective power penalties are determined after transmission. The various eye diagrams are also analyzed for back-to-back (B2B) and 50 km upstream link and downstream link transmissions. This work is crucial for offering an all-optical wavelength reuse option for electrical meter reading application.

Keywords: EDFA, holding beam, saturation, DFB, extinction ratio, BER

COGNITIVE ASSESSMENT OF CHATGPT – A GENERATIVE LARGE LANGUAGE MODEL AND UNDERGRADUATE STUDENTS: A COMPARATIVE STUDY IN STRUCTURED PROGRAMMING USING THE REVISED BLOOM'S TAXONOMY

Innovation and Practices in Science, Technology, Engineering, and Mathematics (STEM) for Sustainable Development

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Abstract

Artificial Intelligence (AI) has continued to grow in the recent past considering the huge transformation that it has brought in different sectors of society. Branches of AI have offered solutions to a myriad of emerging challenges triggering the need for investment, research, and policy intervention to ensure successful implementation. Natural Language Processing (NLP), a branch of AI has attracted a lot of attention with the release of Large Language Models (LLM) that are trained using large datasets and with the ability to generate text in a conversational manner. The models are projected to impact different sectors and thus the need to evaluate their performance based on the existing frameworks. The study sort to evaluate the intellectual skills of ChatGPT, a general-purpose NLP system using the Cognitive domain of the Revised Bloom's Taxonomy by comparing it with that of undergraduate students in a Structured Programming examination. It was found that the model outperformed the undergraduate students in all cognitive levels of the Revised Bloom's Taxonomy with an average score of 93% against 45% of the class. The worst performance of the model was recorded at 88% in questions that combined evaluate and analyze levels, followed closely by a score of 89% for those at the create level. It can be concluded that generative models possess better intellectual skills in structured programming compared to undergraduate students when evaluated using the cognitive domain of the Revised Bloom's Taxonomy. Better training of the models will mostly likely improve performance in all levels of the domain. The findings point to the huge impact that the generative models will have in the education sector in areas such as personalized learning, lesson planning, preparation of test items, and assessment & evaluation of learners.

Keywords

Artificial Intelligence, Large Language models, Revised Bloom's Taxonomy, Programming

ACTION OF THE DIHEDRAL GROUP D_N ON SETS OF NON-DIAGONAL VERTICES OF A REGULAR N – GON

Innovation and Practices in Science, Technology, Engineering and Mathematics (Stem) For Sustainable Development

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Abstract

Contribution of mathematics in science, technology and engineering cannot be underscored. This calls for continuous development of algebraic structures to offer grounds for solving existing and emerging problems in real life. The structure (G, X) , is a transitive group G acting on a set X , which results from blending group theory and graph theory. The concepts of rank, subdegrees and suborbital graphs of (G, X) have formed a subject of recent study through variations of G and X . The action of the symmetric group S_n on various sets has been thoroughly worked on. Recently, the action of the subgroups of S_n has revealed interesting results in this regard. The action of the dihedral group (D_n) acting on the sets of diagonal vertices of a regular n -gon has been examined. The objective of the study is to determine transitivity, rank and subdegrees of D_n acting on the sets of non-diagonal vertices of a regular n -gon. Transitivity of the action was determined by using the *orbit-stabilizer theorem*, to compute the size of the orbit of any element in some set S . The stabilizer of some element in S was identified after which *Cauchy-Frobenius lemma* was employed on the action of the stabilizer on S to calculate the rank. The choice of the finite group is not only an encouragement to aspiring researchers but also applicable in modelling for engineers. The results have been discussed in form of proved theorems and propositions. The findings reveal an equivalence between the action of D_n on the sets of diagonal vertices of a regular n -gon and that of the sets of non-diagonal vertices.

Keywords: Group action, Dihedral group, transitive action, rank, subdegrees

PRESERVING PRIVACY: HOW GOVERNMENTS AND DIGITAL SERVICES CAN HARNESS ZERO-KNOWLEDGE PROOFS FOR SECURE IDENTIFICATION

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Abstract - Amidst rapid technological advancement and digital transformation, ensuring privacy and data security is paramount. Governments and digital service providers face the challenge of establishing secure identification systems that protect individuals' personal information while enabling reliable authentication and seamless user experiences. Traditional identification methods often require individuals to disclose sensitive personal information, leading to privacy risks and potential data breaches. Zero-knowledge proofs (ZKPs) have emerged as a promising solution to address these concerns. By leveraging ZKPs, individuals can authenticate their identities or assert specific attributes without revealing sensitive data. This approach holds great potential for preserving privacy while enabling efficient and trustworthy verification processes. This paper explores ZKPs and how governments and digital service providers can utilise this technology to achieve secure identification while upholding privacy. A key focus is prototyping a secure identification protocol using ZKPs. Through practical implementation, this research aims to demonstrate the reliability and effectiveness of ZKPs in real-world scenarios.

Keywords: zero-knowledge proofs, privacy, digital identity, governments, digital services.

GLOBAL STABILITY OF CANCER ENDEMIC EQUILIBRIUM POINT USING MATHEMATICAL MODELING APPROACH IN THE PRESENCE OF CHEMOTHERAPY

Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable
Development

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Abstract

The use of Mathematical models in simulating dynamic biological processes has been in existence for a long time. In this research a SEIR mathematical model is considered for the effects of chemotherapy on cancer dynamics using Delay differential equations. Delay differential equations are preferred since they give account for the duration between the infection and when the symptoms are fully observable. Chemotherapy is an effective way of controlling tumor growth without affecting the non-cancerous cells as opposed to radiation therapy. The number of new cells that get infected with cancer virus from one infectious cell is called reproduction number denoted by R_0 . If the numerical value of the reproduction number R_0 is greater than one then the Cancer Endemic Equilibrium Point (CEEP) is stable, indicating that there is widespread of cancer within the body cells whereas if the value of R_0 is less than one then CEEP is unstable. The reproduction number shall be calculated using next generation matrix method which is suitable for compartmental models for the spread of infectious diseases. MATLAB computer program shall be used for numerical simulations to validate the analytic results. The stability of the Cancer Endemic Equilibrium Point shall be determined using quadratic Lyapunov function. Lyapunov function is used to check whether a system is stable or not since the method doesn't require one to find the exact solution of the system in order to check the stability of the system. The study shall help establish the degree of cancer spread within the body for better drug administration.

Keywords: Tumor growth, Reproduction Number, Delay, Cancer Endemic Equilibrium Point, Chemotherapy

EXTREME VALUES AND RELIABILITY MEASURES OF CONTINUOUS ERLANG MIXTURES

Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development

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Abstract

Extreme value theory has been presented and the limiting distributions of continuous Erlang mixtures and their mixing distributions obtained. Erlang mixtures have also been grouped according to their extreme value types. The mean residual lifetime and equilibrium distributions of the mixed distributions have also been derived. Some methods used in the study are the L'Hopital's rule and the Karamata's theorem. Extreme value theory has thus been proven to be applicable in many fields, such as, finance in modeling extreme profits or losses of valuable assets, in assessing and quantifying the risk of extreme natural calamities such as floods, hurricanes and droughts, in engineering to construct structures that will not be affected by extreme conditions such as bridges, dams and aircrafts, in insurance in forecasting extreme events that could result in large insurance claims such as earthquakes and major accidents, and in predicting the probability of rare events such as the COVID 19 and extreme natural disasters.

Keywords: Erlang, Extreme value, mixed distributions

QUALITATIVE AND QUANTITATIVE ANALYSIS OF HIV-1 IN HUMAN BLOOD AND PLASMA USING RAMAN SPECTROSCOPY WITH CHEMOMETRIC ANALYSIS

Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development

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Raman spectroscopy has shown great potential in the characterization of a wide range of media, which may be solid, liquid or gaseous, owing to its ability to accommodate different types of samples without the need for extensive sample preparation. In addition, Raman spectra is a unique signature profile of a given sample. This work reports on the use of Raman spectroscopy, with principal component analysis to detect and quantify HIV-1 in human blood and plasma. Raman spectra of HIV-1 p24 antigen, HIV-1 positive (HIV+) and HIV-1 negative (HIV-) blood and plasma were excited with 785 nm laser and analyzed in the fingerprint spectral range 400-1800 cm^{-1} . Unique Raman bands were observed at around wavenumbers 928 cm^{-1} and 1658 cm^{-1} for HIV- and at 1270 cm^{-1} and 1446 cm^{-1} for HIV+ plasma samples, which were attributed to the vibrational state of amide III of α -helix and the C-H bond bending vibrational mode in proteins and lipids components of plasma respectively. Principal Component Analysis (PCA) distinguished clearly the Raman spectral data for HIV- and HIV+ with sensitivity and specificity of 100% and 89.28% respectively for plasma samples and 83.3% and 100% for whole blood samples, showing that Raman spectroscopy, as a tool, has the capacity to diagnose and quantify HIV-1 in human blood and plasma.

Keywords (Raman spectroscopy, Human Immunodeficiency Virus, Principal Component Analysis, human blood and plasma, vibrational mode)

BIFURCATION AND STABILITY ANALYSIS OF HIV-1 CORONAVIRUS CO-INFECTION MODEL

Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development

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Abstract

Mathematical modeling has enabled epidemiologist to understand best the dynamics of infectious diseases, their impact and future predictions on their transmission and existence. Deterministic Susceptible–Vaccinated–Exposed–Infectious–Recovered–Susceptible (SVEIRS) model on HIV-1 Coronavirus co-infection was formulated based on piecewise linear dynamical systems with constant delay. Delay here accounts for the time lapse between exposure and when the symptoms of the disease appear. Basic reproduction number, R_0 , is the number of secondary infection caused by an infectious individual in a completely susceptible population. It is the threshold parameter on which the growth or reduction of the disease is based and calculated using Next Generation Matrix approach. Next Generation Matrix is used since the model under consideration is compartmental in nature. Disease Free Equilibrium is attained when reproduction number is less or equals to one. Lyapunov function is crucial in verification of stability in dynamical systems with continuously differentiable functions. The Disease Free Equilibrium is globally asymptotically stable whenever the reproductive number is less or equal to one and unstable otherwise. Bifurcation analysis is the change in structural behavior of parameter values. It is useful in checking the effects of parameter values on stability at equilibrium. The Condition for existence of Hopf Bifurcation is

determined based on parameter values of the model. Numerical simulation is then done using Matrix Laboratory MatLab dde23 solver to authenticate the analytic results by graphical representation so as to highlight on future disease dynamics and interventions. Time-delay, vaccination and chemotherapy plays a major role in stabilizing disease free equilibrium.

Keywords: Coronavirus, Bifurcation, Basic reproduction number, Global stability, Lyapunov's method.

SPECIAL CUBIC SIMPLEX LATTICE DESIGN IN ESTIMATION OF FERTILIZER COMPONENT PROPORTIONS FOR OPTIMAL PRODUCTION OF MAIZE YIELD

Sub Theme: Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development.

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Abstract

Response surface Methodology (RSM) entails designs and models that aid in finding the optima of the response variable with respect to two or more dependent variables of interest. In agriculture, researchers have carried out experiments on maize production with different levels of single fertilizer with the aim of optimize output using traditional design methods. However, researches based on mixed fertilizer components are not very common though there is the desire for fertilizer blending. This has left farmers with no option other than to continue applying fertilizer in random proportions that may not guarantee optimal yield with respect to fertilizer components available. The objective of this study therefore, was to determine optimal sets of mixture of fertilizer components that could maximize the maize yield as the output. Di-Ammonium Phosphate (DAP), Poultry manure (guano), Sheep manure, and Farmyard manure were the four independent variables mixed in different proportions according to Simplex lattice design to determine if appropriate synergism exists in any of the blends. A special cubic statistical model for maize yield was then formulated from data obtained from the twenty runs of the design. It was observed from the response surface graph that the binary blend of farmyard manure and poultry manure produced the optimal fertilizer condition. The actual optimal component proportion was **6.67 tons** of farmyard manure mixed with **1.3467 tons** of poultry manure per hectare with the predicted production of **12.17** tons of maize grains per hectare. The study concluded that mixture experiments are appropriate for use when a researcher wishes to determine existence of synergism in mixing components that increases productivity for the response variable of interest. Further, for enhance production, two binary blends farmyard/poultry and DAP/poultry manure were recommended for use with greater proportion of poultry manure in each case.

KEY WORDS: Maize yield; Manure; Mixture experiment; Simplex Lattice Design; Response Surface Methodology.

THE STRUCTURAL, ELECTRONIC AND OPTICAL PROPERTIES FOR SELECTED 211 MAX PHASES: A DENSITY FUNCTIONAL THEORY STUDY

SUB-THEME: Innovation and Practices in Science, Technology, Engineering and Mathematics (STEM) for Sustainable Development

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Abstract

MAX Phases are a class of ternary materials that have continued to play a greater role in the field of materials science due to their unique properties that bridge the gap between metals and ceramics. The studies done so far have proven that MAX phase materials are indeed a promising class of materials in a wide range of applications. However, in spite of this progress, there are still a lot of open questions and properties that needs to be understood. The structural, electronic and optical properties of (Nine) MAX phase materials, namely, Ti₂AlC, Ti₂AlN, Ti₂GaC, Ti₂GaN, Ti₂PbC, Ti₂CdC, Ti₂SiC, Ti₂GeC and Ti₂SnC have been investigated using the density functional theory expressed in Quantum Espresso and VASP codes. The systems were relaxed until the set convergence criteria of forces being less than 0.001 eV/angstrom was achieved. The calculated lattice parameters are in agreement with the previous theoretical research and available experimental data. The electronic properties showed that the dominant states in these (211) MAX Phase materials included Ti_{4d}, Ti_{3s}, Ti_{2p}, C_{2p}, N_{2p}, C_{1s}, N_{1s}, Al_{2p}, Ga_{3p}, Pb_{3d}, Cd_{3d}, Sn_{2p}, Ge_{2p} and Si_{2p} which play an important role in determining the structural, electronic and optical properties of these compounds. The imaginary ϵ'' spectra display various peaks at the infrared region which arises from the intra-band transition of electrons. The real parts of the dielectric functions of all the MAX phases considered in this study showed similar features except those of Ti₂GeN, Ti₂PbC and Ti₂PbN materials. The absorption of the MAX phase compounds under study is found to be dominant in both the visible and ultraviolet regions but weak in the infrared region. Moreover, optical functions also reveal that the reflectivity of the Ti₂AC (A = Ge, Sn, Pb) MAX phases makes them suitable candidates to be used as coating materials. The finding of this study suggest that the nine MAX phases considered in this study are indeed suitable candidates in various industrial applications.

Keywords: MAX phases, Structural, Electronic and Optical properties.

EFFICACY OF SENNA DIDYMOBOTRYA AND THUNBERGIA ALATA PLANT EXTRACTS AGAINST SELECTED BACTERIAL CLINICAL ISOLATES FROM KERICHO REFERRAL HOSPITAL

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Abstract

Bacterial infections are widely distributed worldwide and cause most of the deadly infectious bacterial conditions such as skin and soft tissue infections, respiratory tract infections, meningitis and tuberculosis. These infections have become very common given the ubiquitous nature of bacteria and the emergence of antimicrobial resistant strains. This has continued to be a big challenge and hence the need for search for as alternatives that could be easily available and affordable compared to the costly conventional drugs. This study was carried out to determine the effectiveness of *Senna didymobotrya* and *Thunbergia alata* crude plant extracts against *Staphylococcus aureus*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa* clinical isolates from Kericho referral hospital. Kirby Bauer method was used to determine antimicrobial activity of plant extracts against the test bacteria. Media used was Mueller Hinton Agar. 50mg of extract soaked in 10ml of extracting solvent was impregnated on 6mm diameter paper discs. The impregnated paper discs were mounted on the Plates streaked with test microorganisms and incubated for 24hrs at 37°C. The clear zone of inhibition around the discs was measured in mm. The diameter of inhibited zone is related to antimicrobial susceptibility of the bacterial isolate to crude plant extracts. Methanolic crude plant extract of *T.alata* showed a greater zone of inhibition of 4.8mm and 4mm in *S.pyogenes* and *S.aureus* respectively, this was greater than 3.8mm and 0.00mm in chloromphenicol and penicillin respectively. This showed that crude plant extracts were active on *S.aureus* and *P.aeruginosa* but not *S.pyogenes* that showed resistance after 36hrs irrespective of solvent or region of plant collection. This result suggests that extracts of *Senna didymobotrya* and *Thunbergia alata* have antibacterial activity and can be used as medicine against bacterial infections.

Key Words: *Senna didymobotrya*, *Thunbergia alata*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*

EXTRACTION AND PROFILING OF PHYTOCHEMICALS PRESENT IN SELECTED ORNAMENTAL PLANTS IN KERICHO COUNTY

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Abstract

Bacterial infections are prevalent in most parts of Kenya causing diseases like pneumonia, typhoid, cholera and meningitis. This has contributed to unsustainable socio-economic development following the emergence of antimicrobial resistant strains of bacteria and hence the need for alternative strategies that are not only effective against bacteria but environmentally safe as well. This study was designed to extract and profile phytochemicals present within crude leaves, flowers and roots extracts of *Iris versicolor* and *Nerium oleander* for future antimicrobial activities. The plant parts were macerated and extracted to obtain phytochemicals that were then identified under different classes of compounds by treating them with different reagents following standard laboratory procedures. 250g of the grounded powder of the parts were soaked in 1000mls of Hexane, DCM and Methanol and left to settle for 24 hours after which the solutions were filtered with Whatman No. 1 filter paper. The filtrate was then evaporated to a paste using a rota vapour equipment. The paste was aliquoted into 20gms and refrigerated for future qualitative analysis. 2ml of different test solutions were added to 1ml of the plant parts' extracts solutions to obtain tannins, saponins, terpenoids, flavonoids, steroids, phenols and alkaloids. It was found that the test results of the three solvents used for the extraction of the phytochemicals showed gradient elution of the phytochemicals increasing from Hexane, DCM and Methanol. Hexane extracted tannins, flavonoids and phenols while DCM extracted tannins, saponins, flavonoids and alkaloids. Methanol with highest polarity extracted tannins, saponins, terpenoids, flavonoids and phenols. It was also observed that the polarity of the solvent determined the type of bioactive compounds with the most polar extracting different classes of phytochemicals than the less polar solvent. In all considerations, methanolic extract of *Nerium oleander* leaves and flowers showed positive results for all the phytochemicals present in selected plant extracts.

Key Words: *Iris versicolor*, *Nerium oleander*, Hexane, DCM, Methanol

EVALUATING PREFERENCE VARIATION IN DISCRETE CHOICE EXPERIMENTS USING FARMERS' CHOICE DECISIONS FOR SWEET POTATO VARIETAL TRAITS IN KENYA

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ABSTRACT

The goal of this study was to contribute to our better understanding of the role of farmers' preference variation for sweet potato varietal traits in Kenya through the estimation of several behavioural models, namely, the multinomial logit (MNL), mixed logit (MXL), scaled multinomial logit (S-MNL), generalized multinomial logit (G-MNL), generalized mixed logit (GMXL) models. Data for the study was obtained by evaluating the decision-making behavior of farmer's towards six sweet potato variety traits in a discrete choice experiment (DCE) involving 400 randomly selected farmers from Western Kenya. The six traits evaluated include: yield level, tolerance to pests and diseases, sweetness of the flesh, colour of the flesh, maturity period and price change. Survey results show found significant preference variation in the choice decisions of the farmers on sweet potato traits such as yield level, sweetness of the flesh, colour of the flesh, maturity period and price change. In addition, of all the five choice models estimated in the study, the G-MNL model performed better in modelling choice decisions and in accounting for both taste and scale variation of the sweet potato farmers based on the log likelihood information and the Akaike information criteria.

Key Words: *Preference variation, discrete choice experiment, sweet potato variety.*



