MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

DISSEMINATION OF RESEARCH FINDINGS AND INNOVATIONS CONFERENCE

THEME

Driving Sustainable Development through Research-Driven Innovations, Resilience and Inclusive Growth

PROGRAMME AND ABSTRACTS

THURSDAY, 28th – FRIDAY, 29th MAY 2026

WELCOMING ADDRESSES

PRINCIPAL SECRETARY, STATE DEPARTMENT FOR SCIENCE, RESEARCH AND INNOVATION IN KENYA, PROF. SHAUKAT ABDULRAZAK

Distinguished Guests, Governors, LREB CEO Mr. Victor Nyagaya, Vice Chancellors, Development Partners and Researchers, it is a privilege to address this Conference.

Such Conferences are where evidence meets policy and knowledge meets action, exemplifying Kenya's commitment to science-driven development. The Lake Region Economic Bloc, comprising 14 counties and home to over 15 million Kenyans, represents our boldest experiment in cooperative regional governance. Research and innovation are the engines that drive LREB.

Regarding the six conference themes, the Government's expectations are clear. First, in Agriculture and Food Security, research must reach small-scale farmers by offering practical pathways in climate-smart agriculture, crop diversification, and post-harvest loss reduction to fulfill the BETA agenda. Secondly, in Health and Well-being, findings must address the region's disease burden, including malaria, HIV/AIDS, and non-communicable diseases (NCDs), while feeding directly into County health budgets and the Lake Region Economic Bloc's health innovation frameworks. Research must guide climate-adaptive, people-centered infrastructure and urbanization that actively avoids past mistakes.

To drive sustainable development, regional research must simultaneously unlock cross-border trade, investment and industrialization corridors with Uganda and Tanzania. This will ensure access to a market of over 300 million consumers while urgently building climate resilience to protect the embattled Lake Victoria basin. I encourage member Counties to focus on actionable Climate Plans, sustainable fisheries management, and nature-based livelihoods. Universities need to undertake research that seamlessly bridges education, TVET programs, and economic innovation to harness youth potential and successfully position Kenya as a premier regional innovation hub by 2030.

Kenya's research investment should be guided by science, prioritizing evidence-based decision-making to guarantee better seeds, modern hospitals, smart cities, and skilled youth in the region. Therefore, as I officially open this conference, I challenge every researcher presenting here to act as a catalyst and answer the critical questions facing the Lake region. I wish you fruitful deliberations.

Prof. Shaukat Abdulrazak
Principal Secretary (PS) for the State Department for Science, Research, and Innovation in Kenya

PRINCIPAL SECRETARY, THE STATE DEPARTMENT FOR HIGHER EDUCATION AND RESEARCH, DR. BEATRICE MUGANDA INYANGALA

It is a true honor to be with you today at the Dissemination of Research Findings and Innovations Conference, hosted by Masinde Muliro University of Science and Technology. This year's theme, "Driving Sustainable Development through Research-Driven Innovations, Resilience and Inclusive Growth," is both timely and inspiring.

At the Ministry of Education, we are heartened to see our higher education institutions making significant strides through research that influences both our citizens' livelihoods and our economy. Research and innovation are the keys to making this impact. I recognize that at MMUST, there is a strong belief that exceptional teaching goes hand in hand with exceptional research. Each class you develop and every program you provide aims to cultivate students who don't just memorize information but who also create new knowledge and tackle real-world challenges.

The government's dedication to higher education and research is evident in various policy and institutional efforts. Kenya's Vision 2030 identifies knowledge and innovation as vital pillars of national competitiveness. Additionally, the Bottom-Up Economic Transformation Agenda (BETA) highlights science, technology, and innovation as essential areas for fostering inclusive growth.

Through the National Research Fund, we are dedicated to increasing investments in research that addresses Kenya's most pressing developmental challenges, including health, agriculture, manufacturing, climate change, and the blue economy. We are also enhancing the Kenya National Innovation Agency to create structured pathways that transition innovations from the lab to the market, from research papers to boardrooms, and from pilot projects to national implementation.

Furthermore, we are prioritizing university-industry partnerships, recognizing that the most meaningful research often occurs at the intersection of academic inquiry and practical application. Our goal is for universities to be not only centers of learning but also engines of enterprise, innovative problem-solving and national development. Thank you.

Dr. Beatrice Inyangala
Principal Secretary (PS) for the State Department for Higher Education and Research in Kenya

CHIEF EXECUTIVE OFFICER NATIONAL RESEARCH FUND, PROF. DICKSON ANDALA

It is a great privilege to join you in this significant Conference. The National Research Fund (NRF) exists to gather, distribute, and manage the financial resources that drive our nation's innovation. This conference is at the very heart of that mission. It is the bridge where scientific findings are transformed into actual government policies. After all, research that remains locked away in journals has not yet paid its full dividend to our society.

To date, the NRF has invested over Kshs. 7 billion in research across Kenya. This funding has supported more than 400 projects, sponsored over 700 postgraduate students, established 19 modern research facilities, and backed over 100 agricultural projects advancing food security. Many of these investments are already making an impact right here in the Lake Region, and we are fully committed to deepening that support.

Going forward, institutions of higher learning in the Lake region must position themselves as trusted advisors on building climate-resilient infrastructure. The NRF has already funded vital research in materials science and urban planning that is ready to be put to work in this region.
Boosting trade, investment, and industrialization through strong university-industry partnerships is also a priority of NRF. The Lake Region's vital sectors, such as tea, sugar, fish, and horticulture, need to be upgraded through research-driven value addition. We are ready to fund the pathways that turn these scientific ideas into commercial realities.

Every piece of research conducted in Kenya must fully comply with NACOSTI's regulatory framework and the Science, Technology and Innovation Act of 2013. I therefore urge all researchers to uphold strict data governance and research integrity since protecting our scientific output is a national duty. The NRF fully endorses the Kenya SRI Synergy Blueprint, which clearly charts the path for coordinated and impact-oriented research.

I assure you that as your partner, the NRF will continue to support researchers and community impact-oriented efforts. I wish you productive discussions and encourage you to connect your science to the lives it is truly meant to serve. Thank you.

Prof. Dickson Andala
CEO, National Research Fund (NRF)

AG. DIRECTOR GENERAL/CEO-NACOSTI, DR. DAVID NGIGI

As NACOSTI, our main goal is to make sure that research and innovation in Kenya meet the highest standards and truly help our country grow. Our responsibility is to ensure all studies are legal, ethical, and credible. Under the Science, Technology, and Innovation Act, obtaining a NACOSTI permit is more than a regulatory requirement; it is a vital mechanism for building trust with local communities and policymakers. By upholding these rigorous standards, we have proudly supported over 1,800 projects nationwide. This includes significant investment right here in the Lake Region, a vibrant hub of 15 million people and home to some of our country's leading research institutions.

This Conference covers vital topics such as agriculture, health, environment, and education, which are important for food security in the region. We must ensure that environmental research matches global standards and that local universities keep training world-class researchers. Moving forward, we want to see more open science, with publicly funded research shared openly rather than locked away. To make this happen, I propose that NACOSTI and the Lake Region Economic Bloc create a formal partnership to build these quality standards directly into the region's development plans.

Ultimately, a research system is only as strong as its weakest link. NACOSTI is here to strengthen every part of that chain, from issuing the very first research permit to sharing the final results on platforms like this conference. We are committed to regulating fairly, coordinating effectively, and championing science that changes lives. Let us work together to turn these research findings into real progress for the Lake Region and all of Kenya.

Dr. David Ngigi
Ag. Director General/CEO
NACOSTI

CHIEF EXECUTIVE OFFICER KENIA, DR. TONNY K. OMWANSA

The Kenya National Innovation Agency (KeNIA) is on a clear mission to help researchers turn their ideas and findings into real-world products and businesses. Currently, the academic system in Kenya mostly rewards researchers for publishing articles instead of starting businesses. KeNIA was created to change this mindset by finding great local innovations, protecting intellectual property, and connecting researchers with the investors and policymakers needed to build successful enterprises.

The Lake Region Economic Bloc (LREB) is a prime area for this kind of innovation, offering huge market opportunities across several key sectors. These areas include agriculture and food security, healthcare, sustainable infrastructure, industrial trade, environmental conservation, and education. To prove that Universities can drive industrial growth, KeNIA even led a delegation of university leaders to South Africa in 2026. The agency is now eager to help the Lake Region launch its own Regional Innovation Week to showcase local talent and ideas on a much larger scale.

KeNIA is calling on all researchers with commercially viable ideas to utilize the agency's support, which includes business incubation, funding advice, and connections to global investors. The agency is fully committed to acting as the ultimate champion for the Lake Region, ensuring that every great scientific finding has a clear pathway to the marketplace.
Thank you

Dr. Tonny k. Omwansa
Chief executive officer
KeNIA

MMUST CHAIRPERSON OF COUNCIL, DR. PAMELA SITIENEI,

On behalf of the University Council, I welcome you to this highly anticipated conference. As the Chairperson of the MMUST Council, it gives me great pleasure to interact with researchers and personalities from the entire coalition of 14 Counties of the Lake Region Economic Bloc (LREB).

The event focuses on sharing important research and new ideas. The themes of this conference, which include food security, health, town development, business, climate change, and education, align perfectly with the University's goals and the development needs of our country.

MMUST strongly believes that working together through national and international partnerships is the best way to solve tough, real-world problems. This conference helps position our university as a leader in creating practical solutions, making sure that the knowledge we gain in the laboratories is actually used to help people in their everyday lives. As a council, we promise to keep supporting great research projects, protecting academic honesty, and building strong partnerships that share African innovation with the rest of the world.

I encourage the creation of partnerships and collaborations while undertaking research of such high magnitude. Further, I challenge all the researchers and participants in this conference to utilize their findings to guide government decisions and build lasting solutions. Finally, I thank the Government of Kenya for supporting higher education research through the National Research Fund (NRF) and NACOSTI. At MMUST, we are determined to tap into this support and become one of the leading institutions undertaking cutting-edge research in the LREB Region.

Once again, welcome to MMUST and to this Research Findings and Innovation Dissemination Conference. I wish you an engaging and exciting three-day knowledge exchange exercise!

Dr. Pamela Sitienei,
Chairperson of Council,
Masinde Muliro University of Science and Technology.

MMUST VICE CHANCELLOR, PROF. SOLOMON I. SHIBAIRO

It is a great pleasure to welcome you to the Research Findings and Innovation Dissemination Conference, organized by MMUST in conjunction with the Lake Region Economic Bloc (LREB). MMUST was founded on the belief that science and technology should drive development, and today we see that promise coming to life. Your presence here highlights our shared commitment to using knowledge and research to transform lives and bring real progress to our communities.

The research and innovation showcased at this conference directly address the pillars of Kenya's future, that is, agriculture, healthcare, sustainable infrastructure, trade, environmental protection, and education. Moving beyond academic theory, this Conference will offer practical, evidence-based solutions designed to tangibly improve the daily lives of Kenyan citizens. MMUST is proud to have a pool of researchers with the requisite knowledge and experience required for undertaking highly impactful studies.

The presence of several Government officials in this Conference is a testament of the government's strong support for science and innovation in the higher education sector. I call upon our industry and development partners to utilize findings by our researchers, as they are practical, ready for investment, and ripe for real-world application. I commend all researchers conducting life-changing studies and urge both young and experienced researchers to strive for top-rate research that has capacity to transform this country.

Once again, I welcome you to this great University. May your dedication to building a vibrant research culture continue to advance not only our university, but also our nation and its people. Thank you.

Prof. Solomon I. Shibairo
Vice Chancellor
Masinde Muliro University of Science and Technology

DVC, PLANNING RESEARCH AND INNOVATION- PROF. CHRISTOPHER NGACHO

This conference is at the very heart of what the Division of Planning, Research and Innovation stands for. We are pleased to steer this conference on behalf of the MMUST. Our vision is to build an impressive research portfolio that not only attracts global funding but showcases the expertise and experience of our researchers. Today's gathering is proof that we are bringing that vision to life.

MMUST has made incredible progress in creating a research culture that answers the direct needs of our country. As the University's organ mandated to steer the research agenda of MMUST, we go beyond managing research projects, building the capacities of our scholars, and supporting them with resources. I encourage our researchers to produce results that impact policymakers, local industries, and everyday communities. We must focus on real-world impact as we write funding proposals and collaborate with other scholars.

This Conference provides unique opportunities for the LREB community to rethink its strategies, policies, and practices through the evidence that will be provided by our researchers. I invite all the stakeholders represented here from the 14 Counties to leverage on the synergies available in this Conference to leapfrog the resilience and quality of the livelihoods of the citizens in the LREB region. Let us seek new approaches to solving our problems while working together to turn our ideas into practical, sustainable solutions.

As a Division, we commit to keep supporting you. We will continue to upgrade our research tools, find new funding, and build strong partnerships that lift MMUST's research profile nationally and globally. Welcome to the Research Findings and Innovation Dissemination Conference 2026, hosted by MMUST and the Lake Region Economic Bloc (LREB). Thank you.

Prof. Christopher Ngacho
DVC, Planning, Research and Innovation
Masinde Muliro University of Science and Technology

REMARKS BY THE DVC, ACADEMIC AND STUDENT AFFAIRS- PROF. HUSSEIN GOLICHA

It is a privilege to speak to this esteemed audience as the Deputy Vice Chancellor responsible for Academic and Student Affairs. While today's conference primarily serves as a platform for sharing research, its importance extends deeply into the academic and student life at our university. Research and academic excellence are two sides of the same coin. The presentations you will witness today are the culmination of an academic environment that we at MMUST have purposefully cultivated—one that fosters curiosity, values thoroughness, and insists on relevance. Every curriculum we create, every program we implement, and every student we nurture is designed to develop graduates who don't just passively absorb knowledge but actively create and apply it. To the students here today—this conference is more than just an event for experienced scholars; it's a glimpse into your future. The researchers you'll hear from were once in your shoes. What sets them apart is their choice to ask profound questions, seek evidence, and engage in scholarship that goes beyond mere grades. I am particularly inspired by the wide range of themes being explored in this conference: Agriculture and Food Security, Health and Well-being, Infrastructure and Sustainable Urban Development, Trade, Investment, and Industrialization, Environmental Conservation and Climate Resilience, and Education, Skills Development, and Innovation. Each of these themes plays a crucial role in shaping our academic programs and preparing our graduates for the world they will navigate and influence. I want to draw special attention to the theme of Education, Skills Development, and Innovation. We are committed to continuously adapting our academic offerings to meet the evolving requirements of industry, government, and society. The research outcomes from this conference will directly guide our curriculum revisions, inform the development of new programs, and enhance our graduate training frameworks. To our dedicated researchers and faculty—your scholarly contributions are vital to our academic integrity. I applaud your commitment and urge you to keep inspiring the next generation of researchers with the same enthusiasm that has brought you to this moment. It is a pleasure to join the Vice Chancellor and the University Council in welcoming all participants to this significant conference. May your discussions be robust, your connections meaningful, and your results truly transformative. Thank you.

Prof. Hussein Golicha
Deputy Vice Chancellor (Academic and Student Affairs)
Masinde Muliro University of Science and Technology

REMARKS BY THE DVC, ADMINSTRATION AND FINANCE - PROF. JOHN KURIA THUO

It is a great pleasure to be here as the Deputy Vice Chancellor overseeing Administration and Finance at this Research Findings and Innovation Dissemination Conference.

While my office may not be the first linked with research dissemination, I want to be clear: without effective administration and sustainable financing, no research agenda, no matter how innovative, can truly come to life. Every significant discovery shared here today is supported by an approved budget, a following procurement process, well-maintained facilities, and a solid administrative framework that enables this important work.

At MMUST, we have intentionally invested in creating a supportive research environment. Our efforts include developing and maintaining research laboratories and innovation spaces, as well as efficiently managing research grants and partnerships. My office plays a vital role in ensuring our researchers have the resources, infrastructure, and institutional support they need to excel in their work. I'm pleased to report that MMUST is continually enhancing its financial stability through various revenue streams, such as research grants, industry partnerships, consultancy, and government funding. This financial strength empowers us to host gatherings like this and to steadily invest in the research agenda that shapes our institutional identity. To our development partners and funding agencies here today, I want to assure you that MMUST is committed to the highest standards of financial accountability, transparency, and governance. Your contributions are handled with integrity and directed towards achieving our shared development objectives.

I also want to extend my gratitude to the organizing committee for your hard work and efficient administration in making this conference a reality. High-caliber events like this don't organize themselves, and your behind-the-scenes efforts deserve to be recognized. As we look ahead, my office will continue to focus on securing and managing the resources needed to sustain and expand MMUST's research and innovation agenda. We will keep building the administrative systems and financial frameworks that allow our university to excel regionally, nationally, and globally.
I warmly welcome everyone participating today and wish you fruitful discussions. Thank you

Prof. John Thuo
Deputy Vice Chancellor (Finance and Administration)
Masinde Muliro University of Science and Technology

REMARKS BY THE REGISTRAR, PLANNING, RESEARCH AND INNOVATION- DR. COLLINS MATEMBA

It is a great honour and privilege to address this distinguished gathering in my capacity as the Registrar in charge of Planning, Research, and Innovation at Masinde Muliro University of Science and Technology. This conference represents the culmination of deliberate institutional planning, collaboration, and commitment to excellence in research and innovation. From the identification of priority research themes, the mobilization of researchers across disciplines, the strengthening of partnerships, and the coordination of this forum, every step has been guided by a shared vision - to ensure that the knowledge generated within MMUST contributes meaningfully to societal transformation and national development. As the office mandated to coordinate planning, research, and innovation, we have continued to work closely with schools, departments, and research centres to align the University's research agenda with Kenya Vision 2030, the Bottom-Up Economic Transformation Agenda, the Sustainable Development Goals, and the University's Strategic Plan. The thematic areas highlighted in this conference - Agriculture and Food Security; Health and Well-being; Infrastructure and Sustainable Urban Development; Trade, Investment and Industrialization; Environmental Conservation and Climate Resilience; and Education, Skills Development and Innovation - demonstrate MMUST's commitment to producing responsive, impactful, and solution-oriented research. Research achieves its true value not merely through discovery, but through dissemination and utilization. It is not enough to generate findings; we must communicate them effectively, translate them into practical solutions, and ensure they reach policymakers, industry, and communities that can drive change. This conference therefore serves as an important platform for bridging the gap between knowledge generation and societal impact. I sincerely commend all researchers, scholars, students, and innovators who have presented their work during this conference. Your dedication to scholarly inquiry and your willingness to subject your work to peer review reflect the growing research culture and academic excellence within our university. I also extend my appreciation to the organizing committee for their commitment and meticulous planning that have made this conference a success. To our partners in government, industry, and civil society, I wish to emphasize that the research showcased here is policy-relevant, innovation-oriented, and partnership-ready. We invite you to collaborate with us in advancing sustainable solutions for our communities and our nation.

As a university, we remain committed to strengthening research-planning frameworks, expanding innovation support systems, and creating an enabling environment for excellent scholarship. Together, let us continue building a university whose research legacy transforms lives, advances development, and impacts society beyond our borders. Thank you.

Dr. Collins Matemba
Registrar Planning Research and Innovation (PRI)
Masinde Muliro University of Science and Technology

DIRECTOR, RESEARCH AND POSTGRADUATE SUPPORT- PROF. FRANCIS OMOTO ORATA

It is with great pleasure that I welcome you to MMUST for the Research Findings and Innovations Dissemination Conference! Today, we gather to celebrate the collaborative spirit of the Directorate of Research and Postgraduate Support at MMUST, which proudly partners with the government to advance the Science, Technology, and Innovation (STI) agenda.

Our Directorate is dedicated to implementing the university's research policies, overseeing ethical reviews, identifying funding opportunities, assisting in proposal development, and ensuring that our researchers' outcomes genuinely make a difference in our communities. In April 2025, MMUST was honored to receive the Good Financial Grant Practice (GFGP) Gold Tier Certification. This accolade highlights our commitment to managing research grants with transparency, accountability, and meticulousness, meeting the expectations of our valued national and international partners.

Our nine research thematic clusters—spanning Environment and Climate, Global Health, Human Development, Advanced Materials, Business and Economics, Governance, Transformative Education, Biodiversity, and Indigenous Knowledge—align closely with the six themes showcased at this conference. We are taking a proactive approach to effectively shape and advance the regional research agenda. I wish to express my deepest gratitude to NRF, NACOSTI, and KeNIA for your unwavering support. Your roles have been pivotal for MMUST in our training and funding initiatives, and your contributions are evident in the success of this conference today.

May this event not only highlight our work but also serve as a platform for building partnerships, exploring funding opportunities, engaging in vital policy discussions, and connecting with our community, ultimately creating enduring impacts for the 15 million residents of the Lake Region. Thank you all for being here and for your commitment to advancing our collective goals.

Prof. Francis Orata Omoto
Director, Research and Postgraduate Support
Masinde Muliro University of Science and Technology

REMARKS BY DIRECTOR SCIENCE PARK INNOVATION AND INCUBATION CENTRE - DR. TECLA SUM

It's a true privilege to speak at this conference as the Director of the Science Park Innovation and Incubation Centre at Masinde Muliro University of Science and Technology. Imagine research as a seed; innovation and incubation are the fertile soil where it thrives. My centre operates at that vital intersection — nurturing and advancing promising ideas, validated research, and creative solutions until they are ready for the real world. Hence, this conference resonates deeply with our mission and values. The Science Park Innovation and Incubation Centre was founded with a specific goal: to connect academic research with entrepreneurial impact.

We collaborate with researchers, students, and industry partners to transform knowledge into tangible products, services, and enterprises that contribute both economically and socially. Consequently, every finding shared at this conference represents a potential opportunity for incubation, commercialization, and scaling. Kenya's innovation ecosystem is evolving at an impressive pace, and MMUST is proud to play a key role in this growth. Our Science Park has facilitated the creation of start-ups and innovations spanning agriculture, health technology, clean energy, and digital solutions — all related to the themes of this conference. The insights shared today could very well lead to the next wave of Kenyan enterprises and solutions. To our researchers, I warmly invite you to explore your findings with us. If your research holds commercial promise, if your innovation can be turned into a product or service, or if your solution can scale, reach out to the Science Park. We offer the necessary infrastructure, mentorship, industry connections, and institutional support to help transform your research into market realities. To our industry and investment partners, the Science Park is your portal to MMUST's pipeline of research and innovation. We welcome collaborative investment, mentorship, and partnership opportunities that can fast-track the transition from research discovery to market-ready solutions. To our government partners, especially within the State Department for Science, Research, and Innovation — we appreciate the policy framework and financial support that have empowered institutions like ours to develop excellent innovation facilities. We look forward to strengthening our collaboration in advancing Kenya's innovation agenda. This conference marks not an end, but a new beginning. Let us ensure the ideas exchanged here flow into our incubation programmes, innovation challenges, and entrepreneurial ecosystem. Together, driven by MMUST's mission of "Technology for Development," let us turn research into impactful solutions, and innovation into exciting opportunities. Thank you.

Dr. Tecla Sum
Director, SPIIC
Masinde Muliro University of Science and Technology

REMARKS BY CHAIRPERSON OF MMUST_LREB ORGANIZING COMMITTEE, PROF. PETER BUKHALA

It is a distinct honor to welcome you to this conference as the chair of the organizing committee. If academic research is a seed, then our center is the fertile soil where those ideas grow into real-world solutions. Our primary mission is to bridge the gap between classroom knowledge and business success.

Every research finding presented at this conference has the potential to become a great, formidable Kenyan enterprise, program, or business.

By focusing on key sectors like agriculture, health, climate change, and technology, this conference underscores our commitment to solving real-world challenges. Scientific breakthroughs and outputs can no longer remain confined to research institutions. They must be clearly disseminated to the communities in order to be truly impactful. This event serves as that vital bridge, translating our research into actionable insights so that policymakers, business leaders, and community partners can collaborate to drive meaningful change.

I appreciate the efforts of our hardworking researchers for sharing their brilliant work today, as well as the organizing committee for putting this event together. My office is fully committed to supporting our researchers, upgrading our innovation tools, and helping everyone at MMUST succeed. Together, let us continue to build a university whose research makes a real, positive difference here in Kenya and across the globe.

I extend a direct invitation to researchers participating in this Conference to be informed that there is a need to turn the conference to an annual event. This conference is the springboard and the beginning of what we can build together. We warmly invite our partners in industry, investment, and government to collaborate with us, co-invest in our students, and help us accelerate these innovations. By working together and staying true to MMUST's mission, we can easily transform today's research into tomorrow's opportunities. Thank you.

Prof. Peter Bukhala
Masinde Muliro University of Science and Technology

MMUST/LREB DISSEMINATION CONFERENCE ORGANISING COMMITTEE MEMBERS

S.No	Name	Role and Institution
1.	Prof. Christopher Ngacho - DVC PRI & Convener MMUST	DVC PRI & Convener MMUST
2.	Dr. Collins Matemba -	Co-convener MMUST
3.	Prof. Francis Orata	Co-convener MMUST
4.	Prof. Peter Bukhala	Co-convener MMUST
5.	Dr. Mustafa Barasa	Co-convener MMUST
6.	Dr. Tecla Tsum	Co-convener MMUST
7.	Dr David Barasa	Member MMUST
8.	Dr. Caroline Wekullo	Member MMUST
9.	Dr. Mary Nelima	Member MMUST
10.	Dr Lydia Anyonje	Member MMUST
11.	Prof. Maurice Omolo	Member MMUST
12.	Prof. Omukunda Elizabeth	Member MMUST
13.	Dr. Rose Opiyo	Member MMUST
14.	Dr. Peter Cherop	Member MMUST
15.	Dr. Collins Odoyo	Member MMUST
16.	Prof. Stanley Omuterema	Member MMUST
17.	Dr. Everlyne M'mbone	Member MMUST
18.	Dr. Victor Dinda	Member MMUST
19.	Dr. Annette Okoth	Member MMUST
20.	Prof Gordon Nguka	Member MMUST
21.	Mr. Kaleb Mwendwa	Member MMUST
22.	Dr. Joyce Kagendo	Member MMUST
23.	Dr. Dennis Ochieno	Member MMUST
24.	Dr. Umulkher Ali	Member MMUST
25.	Dr. Patricia Kariaga	Member MMUST
26.	Dr. Edward Mungalavai	Member MMUST
27.	Dr. Lucy Mandillah	Member MMUST
28.	Ms. Irene Aluku	Member MMUST
29.	Mr. Cannon Odhiambo	Member MMUST
30.	Ms. Delphine Mukhwana	Member MMUST
31.	Mr. Eric Sore	Member MMUST
32.	Mr. Kelvin Kiprotich	Member MMUST
33.	Mr. Patrick Matati	Member MMUST
34.	Mr. Eric Wendo	Member MMUST
35.	Mr. Bonface Wakhu	Member MMUST
36.	Prof Mary Kipmerewo	Member MMUST
37.	Prof. Elyjoy M. Micheni	Ag. DVC for Academics, Research, and Student Affairs. Tom Mboya University
38.	Mr. Barack Otieno	LREB & Co – Convenor
39.	Elyvalet Yegon	LREB - Member
40.	Prof. Collins Ouma	Maseno university
41.	Mr. Kibet Tonwil	LREB - Member
42.	Prof. Dennis Ochuodho	JOOUST-Member

MMUST/LREB DISSEMINATION CONFERENCE GUESTS FROM PARTNERS REPRESENTATIVES

S.No	Name	Partner Institution
1.	Mr. Barack Otieno	LREB, County Government of Kakamega
2.	Dr. Enock Musau	Kisii University
3.	Dr. Charles Momanyi	Kisii University
4.	Dr. Mwau Cynthia	Kisii University
5.	Dr. Joseph Langat	Kisii University
6.	Momanyi A. Geofrey	Kisii University
7.	Dr. Victor Shikuku	Kaimosi Friends University
8.	Prof. Samson Rwahwire	Busitema University
9.	Dr. Fulgensia K. Mbabazi	Busitema University
10.	Bagoole Christopher	Busitema University
11.	Tumwesigye John paskari	Busitema University
12.	Benard Samba	Grate Lakes University of Kisumu
13.	Dr. Florence Odiwuor	Rongo University
14.	Collins Otieno Majengo	Kibabii University
15.	Job Inyangala	The Co-operative University of Kenya
16.	Sylvester Odundo	Kaimosi Friends National Polytechnic
17.	Dr. Maulidi Barasa	Technical University of Kenya
18.	Prof. Elyjoy M. Micheni	Ag. DVC for Academics, Research and Student Affairs. Tom Mboya University
19.	Mr.Emitati Job Washuma	Mumias west TVC

CONFERENCE PARTNERS:

Ministry of Education
REPUBLIC OF KENYA

Masinde Muliro University of Science and Technology
Technology for Development

Kenia
Kenya National Innovation Agency

Lake Region Economic Bloc

NRF KENYA
NATIONAL RESEARCH FUND

NACOSTI
National Commission for Science, Technology and Innovation

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DTB
DIAMOND TRUST BANK

Kisumu Sunset Hotel

Midland Emporium Ltd

BOMET UNIVERSITY
Green Economy for Sustainability

OFFICIAL OPENING AND KEYNOTE ADDRESS

DAY ONE: THURSDAY, 28TH MAY 2025

TIME	ACTIVITY	RESPONSIBLE
Chair of Session: Prof. Elizabeth Omukunda **Rapportuers: Dr. Lydia Anyonje, Ms. Wangare Wambugu**		
0800-0830	Log-in and Registration	Secretariat: Irene Aluku, Delphine Mukhwana/ M. Barasa
	OFFICIAL OPENING OF THE CONFERENCE	
0830-0900	**WELCOMING REMARKS** **Dr. Tecla Sum – Director,** Science Park Innovation and Incubation Centre **Prof. Francis Orata, Director**, Research and Postgraduate Support. **Dr. Collins Matemba** – Registrar PRI **Prof.Christopher Ngacho**. Deputy Vice Chancellor (Planning, Research, and Innovation)	Dr. T. Sum Prof. F. Orata Dr. C. Matemba Prof. C Ngacho
	Prof. Hussein S. A. Golicha – Deputy Vice Chancellor (Academics & Students Affairs) **Prof. John Kuria Thuo** – Deputy Vice Chancellor (Administration & Finance)	Prof. C Ngacho - DVC (PRI)
0900-1100	**OPENING REMARKS** **Prof. Solomon Shibairo**- Vice Chancellor	Prof. C. Ngacho- DVC (PRI)
	Dr. Pamela Sitienei - Chairperson of Council. MMUST **Dr. Tonny K. Omwansa** – CEO KeNIA **Dr. David Ngigi** – CEO NACOSTI **Prof. Dickson Andala** – CEO NRF **Dr. Beatrice Inyangala** – PS Principal Secretary, the State Department for Higher Education and Research, Ministry of Education, Kenya **Prof. Shaukat Abdulrazak –** PS Principal Secretary (PS) for the State Department for Science, Research, and Innovation, Kenya	Vice Chancellor, MMUST KeNIA NACOSTI NRF Ministry of Education Ministry of Education
	Group Virtual Photo/Break	DCCM
SESSION ONE **Education, Skills Development, and Innovation: ICT integration, skills for the future, and innovations driving socio-economic transformation.**		
Chair of Session: Dr. David Barasa Rapporteurs: Mr. Erick Wendo/Ms. Sheila Nangena		
1100-1115	**Kaleb A. Mwendwa, Francis Orata Omoto, Peter. W. Bukhala, Christopher Ngacho;** Enhancing Research Excellence and Accountability: MMUST's Gold Tier GFGP Certification, Seed Money	

	Programme, and Capacity Development Pathways in Research Management
1115-1130	**Job Sirengo Lusweti, Dr. Annette Okoth, & Dr. Drinold Mbete;** Modeling of Prostate Cancer Recurrence Conditional to Treatment Assignment Using Bayesian and Joint Models; A Literature Review.
1130-1145	**George Evans Nasitsi, Prof. Edwin Wamukoya, Dr. Roselyne Odiango;** Parental Influence On Nine to Twelve-Year-Old Girls Participation in Association Football in Butere Sub – County Kakamega.
1145-1200	**Dr. Cynthia Mwau & Dr. Bulinda Major Vincent**; Competency-based Curriculum AI-Driven Education Technology for Equitable and Affordable Access of Education in Kenya
1200-1215	**Joel Shikundi Ongolo;** A Pragmatic Analysis of Metaphors in Ecological Conservation in Navakholo West Kakamega**.**
1215-1230	**Kennedy Bota, Kaleb A. Mwendwa, Caroline, S. Wekullo, Edward M. Mugalavai, Ronald Michieka;** Socio-Ecological Determinants of Gender Based Violence and Resilience in Turkana County, Kenya
1230-1245	**Zadock Mukuyia Oyoolo;** Analysis of Cry as Semiotic Communication in Ali Akeko's Luyia Popular Song *Ingulikho*
1245-1300	**Silvester Odundo and John Wycliff Okumu;** Implementation of CBET Curriculum from Trainers' Perspective: A Case Study of Kaimosi Friends National Polytechnic in Vihiga County, Kenya
1300-1400	**LUNCH BREAK**
SESSION TWO **Education, Skills Development, and Innovation: ICT integration, skills for the future, and innovations driving socio-economic transformation.**	
Chair of Session: Mr. Barack Otieno, Dr. Everlyne M'mbone **Rapporteurs: Dr. M. Nelima/ Dr. M. Barasa**	
1400-1415	**James B. Ouda, Caroline S. Wekullo & Rose A. Opiyo;** TikTok Cyberbullying and Psychosocial Effects among Gen Z University Students in Kenya: Evidence from Masinde Muliro University of Science and Technology
1415-1430	**Rose Atieno Opiyo, James Bill Ouda, Elvis Kauka, Caroline wekullo & Henk van Woudenberg;** Gamifying Evidence: The WOTS Participatory Methodology as an African-Owned Instrument for Educational Culture Diagnosis and CBC Reform in Kenyan Secondary Schools
1430-1445	**Lucy Mandillah & Stanley Omuterema;** Protecting Sacred Cultural Heritage Sites for Sustainable Development in Western Kenya.
1445-1500	**Dr. Eglay Tsuma, Prof. Peter Bukhala, Livingstone Eshitika, Mervyn Odeo;** Diversity, Equity, and Inclusivity in Employment; the Social Dilemma in Higher Education in Kenya
1500-1530	**PLENARY SESSION**
SESSION THREE: **Agriculture and Food Security: Innovations in crop and livestock productivity, agribusiness, and value chains.**	
1530-1545	**Sarah Nelima Walekhwa, Prof. Levi Akundabweni, Prof. Matteo Francavilla & Dr. Umulkher Ali**; Valorising Lake Victoria's Water

	Hyacinth into A Sustainable Biochar for Soil Fertility Enhancement and Nyota Bean Productivity in Kenya's Lake Basin Agricultural Systems.
1545-1600	**Florence Odiwuor, S. Gudu S, E. Ouma, B.A. Were, F. Wamunga;** Evaluating the performance of value-added Sorghum porridge in improving the diets of Pre-School Children in Migori and HomaBay Counties
1615-1630	**Collins Otieno Majengo, Jonathan Mutonyi, Caroline Agamala Kundu, and Francis Namasake Muyekho;** Effect of Biochars Mixed with Different Phosphorus Rates on Selected Soil Chemical Properties in Western Kenya.
1630-1645	**Onyango Evans Ochieng;** Phenotypic Evaluation and Genetic Mapping of Smut Disease Resistance in Napier Grass (*Pennisetum Purpureum*)
1645-1700	**Nunduc O, Otokoma R., Wakhungu JW, Munyasi JW, Muyekho Francis** Evaluation of Sugarcane Tops-Based Feed Rations for Enhanced Dairy Production among Smallholder Farmers in Malava Sub-county, Kakamega County, Kenya.
1600-1615	**PLENARY SESSION**
	END of DAY ONE

DAY TWO: FRIDAY, 29TH MAY 2026

TIME	ACTIVITY	RESPONSIBLE
0730-0800	Log-in and Registration	Secretariat
SESSION FOUR: 1. **Environmental Conservation and Climate Resilience: Sustainable natural resource management, climate change adaptation, and disaster risk reduction.** 2. **Climate Innovations and Technologies.**		
Chair of Session: Prof. Stanley Omuterema Rapporteurs: Ms. Doreen Ashioya, Kaleb Mwendwa		
0800-0815	**Chumba Reuben, Muyekho Francis Namasaka, Ogemah Vitalis, Gebrehawariat, Yosef Kidane, Omollo Jacob, Oulu M., Awiti A;** Agroecology: From Evidence to Policy - Shrub Based IntercroppingSystems for Food Security and Biodiversity Conservation in theLakeBasin Region of Kenya.	
0815-0830	**Joseph Kimutai Langat and Fred Monari**; Soil Health Assessment of Lelaitich Ecosystem in Bomet County, Kenya	
0830-0845	**Ogenga J.O, Ngaira J.K, Mugalavai E.M;** Examining community participation in disaster risk management for food crop development under the changing climate in Siaya County, Kenya	
0845-0900	**Victor Shikuku ;** Enhanced adsorption of bamboo-based hydrochar via Fenton oxidation for defluoridation of water: Optimization, operational parameters, regeneration, cost analysis and mechanistic insights	
0900-0915	**Benard Samba**; Integrated Bio-Sanitation Technology for Reduction of Fecal Water Pollution and Climate-Resilient Resource Recovery in Secondary Schools of the Lake Victoria Basin, Kenya.	
0915-0930	**Christabel Ong'ayo, Issah W. Kweyu and Peter Bukhala;** Effectiveness of an Eight Week Exercise Therapy Programme On Lumbago Management Among Staff at Masinde Muliro University of Science and Technology	
0930-0945	**Peter O. Odhiambo, Dr. J.O. Owino, Prof. F.O. Orata and Dr. Tecla Sum Psuma and F.Mwangi;** Development Pathways For Sustainable Aviation Fuels (SAF) From Yellow Oleander (Thevetia Peruviana) In Arid And Semi Arid Lands (ASALs) In Kenya.	
0945-1000	**Peter Otsianda, Stanley Omuterema Oluchiri. Paul Kem, Walter Aswa Nganyi. Nelly Shitakwa Isindu;** Enhancing Usability Of Weather Data And Information Using Anticipatory Action Approaches For Improved Livelihoods In Kakamega County, Kenya	
1000-1015	**Tea Break**	
SESSION FIVE:		

Trade, Investment, and Industrialisation: Regional value addition, industrial clusters, entrepreneurship, and market linkages.	
1015-1030	**Dr Nancy Gakahu, Dr David Barasa, Dr Evans Oruta** ;Assessing the Impact of Digital Governance Initiatives on Equitable and Inclusive Service Delivery in Kenya: A Case of Kisumu, Busia and Kakamega Counties
1030-1045	**Charles Momanyi, Maengwe Orwaru, Lameck Ondieki Agasa, Ronald Tombe**; Digital Transformation and E-Commerce Adoption for Financial Inclusion and Growth of SMEs in Kenya
SESSION SIX **Health and Well-being: Public health, disease prevention, healthcare systems, and community health initiatives**	
Chair of Session: Prof. P. Bukhala, Dr. Erick Anyira **Rapporteurs: Mr. Canon Odhiambo, Annette Okoth**	
1045-1100	**Everlyne Morema, Claudia Hanson, Morris Senghor Shisanya;** IPCC: A Model for Integrating Preconception Care Services for Improved Maternal and Neonatal Outcomes.
1100-1115	**Job Inyangala, Fidelis Musena Mukudi, Ronald Ojino, Morris Senghor Shisanya;** NLP Framework for Automated Symptom Severity Staging in Heart Failure and COPD Clinical Notes Using Ontology Integration: A Study Protocol.
1115-1130	**Dr. Roselyne Odiango (PhD),Dr. Gordon Nguka(PhD), Edinah Sabiri;** Community Health Interventions Through Physical Activity and Nutritional Counselling Among Geriatrics During Covid-19 Pandemic in Kakamega County Kenya.
1130-1145	**Christabel Ong'ayo, Issah W. Kweyu, Peter Bukhala;** Role of Sports in Health Advocacy: Lessons from Kenya – A Review.
1145-1200	**Barasa Mustafa;** Cytokine-CpG Motif Oligodeoxynucleotide Co-inoculation in the Murine Malaria Model.
1200-1215	**Tyrus Omondi Swaya, Douglas Muchika, Ng'wena Gideon Magak;** Improving Prostate Cancer Diagnosis in Resource-Limited Settings Using HOXB13 and Prostein Immunohistochemistry.
1215-1230	**Ruth Shitabule, Everlyne Morema, Tecla Sum, Morris Senghor Shisanya;** Variations in postnatal care (PNC) interventions provided to newborns in health facilities across Kakamega County, Western Kenya.
1230-1245	**Prof Mary Kipmerewo, Dr Sally Oronje, Dr Wilfrida Bore**; Capacity building for frontline healthcare workers on Emergency Obstetric and Newborn Care in Bungoma County, Kenya.
1245-1300	**Lijodi Brenda, Benjamin Wamalwa, Mary Mwangi, Daniel Korir, Kevin Ouma, Peter Gitonga, Joseph Choge;** Developing A University-Wide Mental Health Screening and Referral Program for Students at Masinde Muliro University of Science and Technology.
1300-1330	**PLENARY SESSION**
1330-1415	**LUNCH BREAK**
SESSION SEVEN:	

Infrastructure and Sustainable Urban Development: Transport, housing, water, sanitation, and renewable energy solutions.	
Chair of Session: Dr. P. Cherop Rapporteurs: Dr. C. Odoyo,	
1415-1430	**Enock Musau, Cornelius Kurere, Fridah Chepleting, Joshua Makori;** The Paradox of Active Transport: Environmental Quality as a Critical Moderator of Transport Mode and Health Outcomes in Kibra, Kenya
1430-1445	**Patrick Owino, Peter Cherop, James Owuor;** A Data Driven Study through Real Time Monitoring of Energy Usage at MMUST: A Potential for Replicable Models
1445-1500	**Dr. Maulidi Barasa;** Hierarchical Reinforcement Learning for Wind Farm Wake Steering: A FLORIS-Based World Model Approach
1500-1530	**PLENARY SESSION**
	CLOSING SESSION ➢ Director Research, & Postgrauate Support ➢ Registar PR&I, MMUST ➢ DVC-PR&I, MMUST ➢ VC, MMUST

ABSTRACTS

SESSION ONE

Education, Skills Development, and Innovation: ICT integration, skills for the future, and innovations driving socio-economic transformation

Enhancing Research Excellence and Accountability: MMUST's Gold Tier GFGP Certification, Seed Money Programme, and Capacity Development Pathways in Research Management

Kaleb A. Mwendwa (Grants Coordinator), Francis Orata Omoto
(Director, Research and Postgraduate Support), Peter. W. Bukhala
(Director, Institutional Advancement) Christopher Ngacho
(Deputy Vice Chancellor, Planning, Research and Innovation)

Abstract

The Grants Office of Masinde Muliro University of Science and Technology (MMUST) is pleased to share institutional progress at this dissemination conference. As a key player in Kenya's Lake Region Economic Bloc (LREB), MMUST continues to strengthen research governance through the University Seed Money Funding Programme. This initiative has supported researchers in generating preliminary data, fostering innovation, and advancing competitive research portfolios. MMUST is proudly certified at the **Gold Tier** level of the ARS 1651:2018 Good Financial Grant Practice (GFGP) standard. This certification underscores the University's robust systems for financial accountability, transparency, and grant stewardship, significantly enhancing its standing with international and local donors. Complementing these efforts, MMUST has invested in **Research Management (RM) capacity development**. Through short courses developed in partnership with the Southern African Research and Innovation Management Association (SARIMA) between 2020 and 2022, and in collaboration with Nelson Mandela University (NMU-SA), University of Pretoria (UP-SA), and University of Southampton (UK), MMUST has addressed critical capacity gaps in four key RM competencies: **Resource Management, Project Management, Data Management, and Intellectual Property Management**. A retrospective cohort study led by the Grants Office revealed persistent gaps in these areas and demonstrated positive outcomes, including increased networking, expanded capacity development opportunities, and improved researcher skills. The presentation will highlight outcomes from both the Seed Money Programme and RM capacity building initiatives, lessons learned, and success stories. It will also showcase how these interventions, combined with GFGP Gold Tier certification, position MMUST as a reliable partner for donors and collaborators. MMUST invites the National Research Fund (NRF) to support the University through **GoK/MMUST Contribution** (matching or co-funding component) that is often required by donor for large grants. This partnership will strengthen MMUST's competitiveness in securing external grants and amplify research impact across Kenya. The Grants Office remains committed to building a sustainable culture of accountable, high-quality research management aligned with national and international standards.

Keywords: GFGP Gold Tier, Research Management Capacity, Seed Money Funding, International Partnerships, SARIMA, Grant Accountability, LREB

Modeling of Prostate Cancer Recurrence Conditional to Treatment Assignment Using Bayesian and Joint Models; A Literature Review.

Job Sirengo Lusweti, Dr. Annette Okoth, & Dr. Drinold Mbete.
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Abstract:

Background: Prostate cancer (PCa) is one of the leading cancers among men. The treatment decisions of the disease are typically guided by patient profiles including age, family history, weight control and the stage of the disease. Further, recurrence of PCa after the initial treatment also depends with both patient specific factors and the type of treatment administered. The study reviewed joint modeling strategies that have been applied to PCa recurrence in order to predict the future treatment assignments based on patient's profiles.
Methods: The search strategy focused on the title or abstract, using PubMed databases up to and including February 2026 by use of specific words such as Bayesian joint model, prostate cancer, prostate specific antigen and treatment. The papers were identified based on studies that used or developed the Bayesian joint model to predict recurrence of prostate cancer on condition that the treatment that was assigned is indicated.
Results: Ten relevant full-text papers that best illustrated the joint modeling framework and summarised its applications in prostate cancer and treatment were selected to be included within this review. The findings showed that, (3 of 10, 30 %) focused on the Bayesian joint modelling framework. For prostate cancer treatment, (6 of 10, 60%) focused on either radiation therapy,chemotherapy or active surveillance; where 2 of 6 papers were based on active surveillance, 3 on radiation therapy and 1 on chemotherapy treatment.
Conclusions: Bayesian and Joint models are essential in analyzing prostate cancer progression and recurrence by integrating longitudinal biomarkers and survival data. The models enhance prediction accuracy and support personalized treatment decisions or assignments.

Parental Influence On Nine to Twelve-Year-Old Girls Participation in Association Football in Butere Sub – County Kakamega.

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Prof. Edwin Wamukoya, edwinwamukoya@gmail.com
Dr. Roselyne Odiango. rodiango@mmust.ac.ke

Abstract

Parental influence was key in nine to twelve-year-old girls' participation in association football. Studies were scarce, hence gender disparities in research and practice. The study assessed the level of girls' participation, determined the level of parental involvement, identified factors that determined parental involvement, and assessed parental attitudes. The targeted population was 8189 girls. Total respondents were 438 (parents and coaches). Study design was descriptive cross sectional. Data was collected using semi structured questionnaires. Data collected was subjected to regression analysis using the software statistical package for social

sciences version 25, and descriptive analysis. Findings showed that; 42.2% of girls were active while 57.8% were inactive. Socio-demographic assessment revealed 57.1% female parents and 42.9% male parents responded. Parents (97%) rated their daughters' participation as high. Parents involved themselves through; directive behaviour 74.4%, praise and understanding 80%, active involvement 59.8%. Regression analysis revealed three variables with positive coefficients as 0.00984, 0.01180, 0.01156 respectively, $P<0.05$, hence statistical. Descriptive findings revealed push factors for parental involvement as parental ability to support girls; financially at 37.4%, logistically at 47%, emotionally at 39%, technically at 43.7%. Regression analysis showed variables with positive coefficients as; 0.01004, 0.01160, 0.01264, 0.00842 respectively, $P<0.05$, hence statistical. Parents exercised their attitudes affectively at 72.7%, cognitively at 71.3%, behaviourally at 85.35%. Positive coefficients were 0.01268, 0.013040, 0.01651 respectively, $P<0.05$, hence statistical. Parental financial, logistical, emotional and technical abilities to support their daughters' participation were below average. Further research, formulation of policies was recommended.

Competency-based Curriculum AI-Driven Education Technology for Equitable and Affordable Access of Education in Kenya

Dr. Cynthia Mwau & Dr. Bulinda Major Vincent
Department of Mathematics and Actuarial Science,
Kisii University*

Abstract

In Kenya, the Competency-Based Curriculum (CBC) was launched in 2017 to promote student-centered learning with an emphasis on practical skills, critical thinking and creativity. Yet barriers remain to implementation include the urban-rural divide, lack of infrastructure, lack of teachers, gender digital access as well as affordability difficulties. In this research, we propose an AI-based education technology approach to provide quality competence-based education (CBE) at a low cost and make it accessible to all students in junior high. A 5-layer conceptual AI platform that is gender-sensitive, focusing on mobile-first, low bandwidth and offline capabilities was developed. This conceptual prototype informed the development of the AI driven platform for equitable CBE access. Further, convergent mixed-methods approach was used to survey thirty stakeholders comprising 66.7% students and 33.3% instructors at two different junior secondary schools, one in a rural area (Kiamabudu DEB) and one in an urban area (Jogoo). The quantitative study included ordinal logistic regression, Welch's t-test, PCA, correlation analysis and optimization using Linear Programming. The study results indicated that adoption of AI was most significantly predicted by digital access ($\beta = 3.57$, $p = 0.017$) and teacher preparation ($\beta = 2.53$, $p = 0.022$). The significant difference on gender was that, males had slightly more digital access. Optimization modeling revealed that stakeholders identified customized learning paths (33.33%) and interactive content (36.67%) as the most beneficial when resources are restricted. Moreover, half of the respondents from the study sample considered AI to be a beneficial influence on their academic achievement. The study's findings suggest that CBC implementation can be scalable and inclusive with stakeholder-driven AI design, fair digital access and deliberate teacher capacity building. These findings align with the Kenya's National AI Strategy 2025-2030 and provide pragmatic recommendations for educators, policy makers and EdTech developers.

Keywords: Competency-Based Curriculum, AI-driven education, equitable access, digital divide, predictive modelling, optimization, Kenya

A Pragmatic Analysis of Metaphors in Ecological Conservation in Navakholo West Kakamega

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Abstract

The need to protect the environment and build climate resilience has grown both globally and locally, driven by environmental degradation, climate change, and recurring disasters. African communities often use metaphorical language to share environmental knowledge, influence public attitudes, and encourage sustainable ecological practices. This study focuses on environmental awareness, resource management, climate adaptation, and disaster risk reduction, highlighting the role of metaphors in environmental discussions in Navakholo West, Kakamega. Grounded in Kövecses's Extended Conceptual Metaphor Theory (2020), this qualitative research examines how metaphors function in environmental communication. Participants included community members, local leaders, environmental advocates, and advocacy groups—40 respondents in total—selected through purposive and snowball sampling to include those experienced in environmental messaging. Data were collected through interviews, focus groups, observations, and recordings of community dialogues, speeches, campaigns, and ecological stories. From this, 20 metaphorical expressions related to environmental protection and climate resilience were selected and analyzed to understand their roles in message delivery and their impacts on perceptions and behaviors across cultural contexts. The study finds that metaphors simplify complex environmental and climate issues, evoke emotional responses, and encourage active participation in conservation, climate adaptation, and disaster preparedness. Metaphorical expressions such as “our mother," "silent killer,” and “victim” effectively promote awareness of environmental responsibility, ecological preservation, and resource sustainability. The research also shows how culturally relevant metaphors shape community awareness and promote actions to conserve and mitigate climate change. The study contributes to environmental communication and community conservation efforts. The findings suggest that figurative language is a powerful tool for raising environmental awareness and promoting sustainability locally. The insights from these findings are relevant to policymakers, environmentalists, teachers, and climate policy and campaigners, who could incorporate culturally relevant metaphors into climate awareness campaigns, climate resilience plans, and climate conservation education programs to improve public and community understanding.

Keywords: Climate; Conservation; Environment; Pragmatics; Metaphors

Socio-Ecological Determinants of Gender Based Violence and Resilience in Turkana County, Kenya

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Abstract

Climate change and environmental degradation have instigated the need to address gender-based violence, which is exacerbated by the growing conflicts over access to scarce resources. Climate change has the potential to exacerbate already-existing gender disparities, leading to the marginalization, discrimination, and dispossession of women and girls in impacted communities. Using mixed-methods approach, the study explored the socio-ecological determinants and resilience factors affecting GBV prevalence in Turkana County, Kenya. The study was anchored on the ecological model of GBV and the socio-ecological resilience framework. The results showed GBV as a deeply rooted issue, 70.5 % of respondents reported experiences of physical abuse from partners or family members. The results showed a statistically significant relationship between climate effects on household dynamics and the experience of GBV (p = 0.008). According to the results, economic stress and poverty were major significant contributors of GBV represented by 55.8 %, followed by cultural norms and traditions 24%. Other notable contributors of GBV included lack of education and awareness, substance abuse, and weak legal framework. The survivors of GBV employed several coping strategies and support systems to navigate the challenges posed. These Included problem solving (47%), spiritual/religious practices (30.3%), and family support (72%). Surprisingly, a significant majority (67%) did not seek for any formal support services despite the existence of several CBO and government agencies. The study has significant and practical implications for policymakers, government agencies, pastoralist community and researchers in this field to come up with intertwined and multi- sector interventions that operate across different socio-ecological levels to reduce GBV.

KEYWORDS: *Socio-ecological determinants, gender-based violence, socioeconomic, Pastoral community, Turkana,*

Analysis of Cry as Semiotic Communication in Ali Akeko's Luyia Popular Song *Ingulikho*

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Physical Address: MMUST, Literature and Language Education.

Abstract

This paper investigates the semiotic function of vocalized grief in Ali Akeko's Luyia composition, *Ingulikho*, situating the act of crying within the framework of indigenous knowledge systems. While the lyrical narrative revolves around a dispute over the naming of a newborn, the song utilizes the motif of 'crying' to dramatize entrenched familial tensions, inter-generational trauma, and broader sociocultural anxieties about memory, inheritance,

and gendered authority in rural Kenya. These 'cries' encode complex socio-cultural narratives of power, intergenerational trauma, and the erosion of communal stability.

Drawing on semiotic theory (Barthes, 1972; Saussure, 1916) and literature on African oral performance (Nwachukwu-Agbada, 2005; Kamau, 2013), this paper argues that the repeated cry functions as a signifier of unsolved conflict and a catalyst for narrative transformation. The narrative centers on a newborn's delayed naming- a critical juncture in Luyia tradition where the act of naming functions as an assertion of ancestral continuity or, conversely, a site of domestic rupture. By mapping these distinct vocal performances against the backdrop of land alienation and patriarchal naming customs, this paper demonstrates how *Ingulikho* transforms private anguish into a public critique of the paradoxes inherent in modernizing rural Kenya.

The father's resistance to traditional naming protocols is interpreted here as a semiotic reclamation of autonomy, which clashes with the grandmother's invocation of ancestral authority. By analyzing these affective vocalizations, the study reveals how Luyia popular songs act as repositories for indigenous memory, serving as sites for negotiating the tensions between individual psychological healing and the collective pressure of traditional belief systems. Ultimately, this paper posits that the 'cries' within *Ingulikho* are not merely expressions of despair but are rhetorical devices that navigate the intersection of domestic dysfunction and societal transformation. These findings contribute to a broader understanding of how affective vocalization sustains identity and challenges systemic power dynamics within contemporary Luyia popular song landscapes.

Keywords: indigenous knowledge systems, Luyia music, semiotic inquiry, intergenerational trauma, naming practices, Kenyan popular songs.

Implementation of CBET Curriculum from Trainers' Perspective: A case Study of Kaimosi Friends National Polytechnic in Vihiga County, Kenya

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Abstract

Education reforms are expected any time there reviews are done. TVET Act No. 29, 2013 riding upon Sessional Paper number 4 of 2016 was enacted to support reforms in research and training at TVET institutions. Though numerous studies exist on perception of trainees on CBET curriculum implementation, none exist on the trainers' perception. It is on this background that this study was conducted to examine trainer's perceptions and challenges while implementing CBET curriculum in two TVET institutions in Vihiga County, Kenya. Some of the research questions adopted included, 'what is the perception of trainers towards CBET curriculum?' and 'what are likely challenges facing implementation of CBET curricular from the perspective of the trainer'. Using a mixed methods approach, qualitative component of the study was recorded and analyzed thematically in line with study objectives. Quantitative data targeted a population of 200 trainers with a sample size of 59 across gender. Purposive sampling was used to select the institution studied while stratified random sampling was used to select the respondents. Key informant interviews, questionnaires, and observation checklists were used to collect data from the respondents. The data was later analyzed using SPSS and presented as frequency tables, percentages and pictorial diagrams. Findings showed majority of trainers were well versed with CBET concepts with 88.1% confirming having undergone capacity building on CBET. Additionally, 56% of the respondents strongly agreed that they were open to professional development in CBET. Forty-one percent of the

respondents, disagreed that TVET institutions had adequate electronic equipment to support CBET. From the results, there is need for continuous professional development on CBET as well as provision of modern digital equipment to bolster training and learning. The study recommends inclusion of all stakeholders in CBET implementation process.

Keywords: CBET Curriculum, TVET institutions, Trainers, Perception, Challenges

TikTok Cyberbullying and Psychosocial Effects among Gen Z University Students in Kenya: Evidence from Masinde Muliro University of Science and Technology

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Department of Educational Planning & Management, MMUST
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Abstract

Cyberbullying is a critical public health concern among university students globally. TikTok's unique features including duets, stitches, and algorithm-driven distribution, create novel cyberbullying vectors differing from traditional social media harassment. In Kenya, where TikTok dominates Generation Z, research on TikTok-specific cyberbullying in higher education remains virtually non-existent. This study examines forms, prevalence, and psychosocial effects of TikTok-related cyberbullying among Gen Z students at Masinde Muliro University of Science and Technology (MMUST). Descriptive survey with convergent mixed methods was employed at MMUST (n≈20,000). A stratified random sample of 577 students completed a questionnaire assessing cyberbullying victimization across nine forms and psychosocial effects across psychological, social, and academic domains. Qualitative data included Key Informant Interviews (KIIs) with security staff (n=3) and counsellors (n=3), Focus Group Discussions (FGDs) with student leaders (n=6), and In-Depth Interviews (IDIs) with victims (n=2). Victimization was highly prevalent, with 68.2% experienced at least one form, and 42.8% reported recurrent victimization. The most common form was exclusion from group content (27.2%), followed by hurtful comments (15.4%), hate speech (12.7%), doxxing (12.7%), and impersonation (9.1%). Perpetrators were predominantly strangers (39.4%) or anonymous peers (16.1%). Psychosocial effects were severe: 45.5% sleep disturbances, 43.6% low self-esteem, 41.4% anxiety, 40.7% suicidal thoughts, 54.4% lost trust in online friends, 43.9% withdrew socially, 31.0% avoided group work, and 30.2% had decreased concentration. Security staff confirmed high incident frequency. Counsellors reported anxiety (80-85%), depression (70%+), and suicidal ideation (40% in severe cases). Student leaders described a spectatorship culture normalizing harm. Victim narratives revealed psychological distress, social withdrawal, and academic collapse. TikTok cyberbullying is a significant public health concern for Kenyan university students. The high prevalence and severe psychosocial toll demand urgent institutional intervention through updated policies, expanded counselling capacity, and peer support programs with trained digital ambassadors.

Keywords: TikTok, cyberbullying, Generation Z, Psychosocial effects, University students, Kenya, Mental health, Relational aggression

Gamifying Evidence: The WOTS Participatory Methodology as an African-Owned Instrument for Educational Culture Diagnosis and CBC Reform in Kenyan Secondary Schools

Rose Atieno Opiyo, James Bill Ouda, Elvis Kauka, Caroline Wekullo & Henk van Woudenberg [4]
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Abstract

Africa's evidence-to-action deficit in education is not merely a data problem , it is an ownership problem. Externally-driven reform agendas persistently fail to generate the community-embedded, institutionally legitimate evidence necessary to catalyse durable systemic change. This paper presents the *We Own The School* (WOTS) game as a radical methodological response: a gamified, participatory, mixed-methods instrument that simultaneously produces and translates evidence, collapsing the conventional divide between research and action. Deployed across 30 purposively sampled secondary schools in Kakamega County, Kenya spanning public/private and rural/urban contexts WOTS engaged students, teachers, and school leaders in structured collaborative reflection on current versus desired school cultures using the *Student Ownership of Learning* (SOL) taxonomy. Three integrated data streams, quantitative gameplay outputs, facilitated stakeholder dialogues, and validated ownership surveys generated a methodologically triangulated evidence base of exceptional contextual depth. Findings reveal a robust, cross-contextual transition trajectory from formal-pragmatic toward competence-based and cultural school orientations, directly aligned with Kenya's CBC reform imperatives. Student data further confirm moderate-to-high levels of psychological ownership and intrinsic motivation, positioning learners as active epistemological agents not passive reform recipients. Critically, WOTS embodies the principle of Africa-owned evidence generation: contextually grounded, stakeholder-driven, and inherently oriented toward uptake. It challenges externally imposed evaluation paradigms by embedding legitimacy within the communities it studies. This paper speaks directly to E2A 2026's priorities on *evidence legitimacy and ownership*, *systems transformation*, and *inclusive evidence ecosystems* arguing that reimagining Africa's evidence infrastructure must begin where learning itself begins: in the school.

Keywords: Participatory Evaluation; Gamification; CBC; School Culture; Student Ownership Africa-led Evidence; Kenya

Protecting Sacred Cultural Heritage Sites for Sustainable Development in Western Kenya.

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Abstract

Sacred cultural heritage sites in Western Kenya continue to play a critical role in preserving indigenous knowledge, ecological stewardship, spirituality, and community identity. However, increasing climate variability, environmental degradation, land encroachment, custodianship disputes, modernization, and weakening traditional governance systems threaten their sustainability and cultural continuity. This study examined the protection of sacred heritage sites as pathways toward sustainable development, focusing on four sites: Kakamega Tropical Rainforest, Nabongo Cultural Centre *Eshimuli* Shrine, Tachoni Circumcision Baptismal Shrine *(Esitaviicha),* and the Crying Stone *(Ikhongo Murwi).* The study was guided by the Social ecological systems Theory which view sacred cultural heritage sites as interconnected systems where human communities, cultural practices, and ecological environments continuously interact. The study adopted a descriptive qualitative ethnographic research design. Purposive and snowball sampling techniques were used to select 120 participants, including custodians, elders, youth/women representatives, community leaders, county officers, and conservation practitioners. Data were collected through narrations of lived experiences, KIIs, FGDs and participant observation. Data was analyzed thematically using NVivo. Findings revealed that sacred sites remain important reservoirs of indigenous ecological knowledge, food, ritual practices, oral traditions, and climate adaptation strategies. The study further established that sacred sites promote social cohesion, biodiversity conservation, and intergenerational learning. Nevertheless, the sites face major threats including climate change, deforestation, land grabbing, declining youth participation, modern influences, political interference, conflicts and inadequate legal recognition. The study recommends strengthening community-led conservation, IK into climate adaptation policies, promoting youth and women participation, enhancing digital cultural archiving, and establishing collaborative partnerships among communities, universities, governments, and heritage institutions. These interventions are critical for advancing Sustainable Development Goals on sustainable communities, climate action, peacebuilding, and cultural preservation.

Key Words: *Indigenous Knowledge Systems; Sacred Cultural Heritage; Climate Resilience; Community-Based Conservation; Sustainable Development.*

Diversity, Equity and Inclusivity in Employment; the Social Dilemma in Higher Education In Kenya

Dr. Eglay Tsuma, Prof. Peter Bukhala, Livingstone Eshitika, Mervyn Odeo

Abstract

Diversity, equity, and inclusivity have increasingly become important concerns within higher education institutions because they influence representation, fairness, employee experiences, and institutional effectiveness. Institutions of higher learning are expected to uphold principles of equality and inclusivity in employment and leadership structures to reflect the

diversity of the societies they serve as anchored in the Constitution of Kenya (2010), the Universities Act (2012), and the National Cohesion and Integration Act (2008). This study sought to examine the influence of recruitment practices, employee progression, and appointment practices on diversity and inclusivity in employment within higher learning institutions in Kenya. The study was guided by three objectives: to assess how recruitment practices influence diversity and inclusivity in higher learning institutions in Kenya; to examine how employee progression and promotion policies affect diversity and inclusivity in higher learning institutions in Kenya; and to investigate the influence of appointment practices on diversity and inclusivity in higher learning institutions in Kenya. The study was anchored on Diversity Management Theory, Equity Theory, and Social Justice Theory. The study adopted a descriptive mixed-methods research design, integrating both quantitative and qualitative approaches, with MMUST as the case study. The target population comprised staff drawn from academic, non-academic, technical, and library categories. Yamane's formula was used to determine a sample size of 277 respondents. Data were collected using questionnaires and key informant interviews. Quantitative data were analyzed using descriptive statistics, Pearson correlation analysis, and multiple regression analysis with the aid of SPSS, while qualitative data were analyzed through thematic analysis. The study achieved a response rate of 85.9%, with 238 completed questionnaires returned for analysis. The findings revealed statistically significant positive relationships between recruitment practices, employee progression, appointment practices, and diversity and inclusivity ($B = .287$, $p < .001$; $B = .352$, $p < .001$; $B = .409$, $p < .001$). Qualitative findings supported the quantitative results by demonstrating that although institutional policies and procedures intended to promote diversity and inclusivity exist, challenges relating to policy implementation, staff stagnation, unequal access to opportunities, and perceived political influence in appointment systems continue to affect inclusivity outcomes. The study concludes that recruitment practices, employee progression systems, and appointment practices significantly influence diversity and inclusivity in employment within higher learning institutions in Kenya. The study recommends that university councils, university management boards, and human resource departments should strengthen transparent recruitment systems, establish equitable progression frameworks, and ensure merit-based appointment procedures supported by effective accountability mechanisms. The study further recommends that future research should study additional determinants of diversity and inclusivity, including organizational culture, leadership practices, and institutional climate within higher learning institutions in Kenya.

Keywords: diversity, equity, inclusivity, recruitment practices, employee progression, appointment practices, higher education institutions, human resource management.

SESSION TWO

Agriculture and Food Security: Innovations in crop and livestock productivity, agribusiness, and value chains.

Valorising Lake Victoria's Water Hyacinth into A Sustainable Biochar for Soil Fertility Enhancement and Nyota Bean Productivity in Kenya's Lake Basin Agricultural Systems

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Abstract

The Lake Victoria Basin of Kenya is affected by interlinked ecological, agronomic and nutritional challenges that threaten livelihoods, environmental sustainability and food security. Among these challenges is the persistent proliferation of the invasive aquatic macrophyte *Eichhornia crassipes* (water hyacinth) a pernicious weed, which has severely disrupted aquatic ecosystems, fisheries, transport and water quality while imposing significant socio-economic costs on riparian communities. Despite sustained control effort using mechanical, chemical and biological approaches, water hyacinth infestation remains recurrent, costly and ecologically contentious, underscoring the need for innovative, value-added and sustainable management strategies. Concurrently, agricultural systems within the Lake Basin are characterized by highly weathered Ferralsols and Acrisols with low inherent fertility, declining soil organic matter, nutrient depletion, acidity and poor water retention. These constraints have been exacerbated by continuous cultivation, climate variability and over-reliance on inorganic fertilizers, resulting in declining productivity and reduced resilience of small-holder farming systems. This study will incorporate Nyota beans (*Phaseolus vulgaris*) as the test crop. Nyota bean, a bio-fortified climbing variety enriched with iron and Zinc, present a critical opportunity to address micronutrient deficiencies and food insecurity prevalent among vulnerable population, particularly women and children. However, despite their genetic and nutritional superiority, Nyota beans often fail to achieve optimal yields under farmer condition due to the declining soil fertility, limited biological nitrogen fixation and suboptimal nutrient availability, especially nitrogen and phosphorous. Addressing soil degradation is therefore vital to unlocking the full agronomic and nutritional potential of the crop. This study proposes an integrated, circular-economy based solution that valorises water hyacinth biomass through thermal decomposition into biochar, to be sued as a sustainable soil amendment in the Lake Victoria Basin. By converting an invasive aquatic weed into a stable, carbon-rich materials, the study seeks to simultaneously mitigate ecological degradation in Lake Victoria, restore soil fertility, enhance Nyota bean productivity and contribute to climate change mitigation through long-term carbon sequestration. The study addresses four specific objectives which will include; i) systematically characterize the physicochemical properties of water hyacinth, derived biochar produced at three pyrolysis temperatures (350°C, 450°C, and 550°C) and evaluate how temperature-driven variations influence biochar functionality in soil. ii) Quantify the effects of graded biochar application rates (0t/ha, 5t/ha, 10t/ha, 15t/ha and 20t/ha) on soil chemical, physical and biological properties of soil under Lake Basin conditions; iii) Assess Nyota bean growth, nodulation yield and nutrient (Fe, Zn, N and P) uptake under different biochar application rates (0t/ha, 5t/ha, 10t/ha, 15t/ha and 20t/ha) and iv) conduct economic visibility and environmental sustainability assessment of water hyacinth integration into smallholder systems. The

research is expected to generate robust, context-specific evidence on the agronomic, ecological, nutritional and socio-economic viability of water hyacinth, derived biochar as a sustainable soil management strategy. The findings will contribute to scientific knowledge on invasive biomass valorisation, biochar-soil-crop interaction and climate smart agriculture, while informing policy, extension and community-based interventions aimed at sustainable agricultural intensification and ecosystems restoration in the Lake Victoria Basin.

Evaluating the performance of value-added Sorghum porridge in improving the diets of Pre-School Children in Migori and HomaBay Counties

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Abstract

More than a quarter of children under five years, have stunted growth indicating a heavy burden of undernutrition in Kenya including Migori County where 26.4 percent of children are stunted, with boys recording a higher prevalence than girls. The national and county governments have recommended interventions targeting counties with a high burden of chronic malnutrition such as Migori in order to minimize the negative impact of malnutrition in young children. This study therefore evaluated effect of sorghum value-added porridge on nutritional status of pre-school children in Migori and Homabay Counties. The Objective was to test the effect of sorghum porridge fortified with soybean on nutritional status of pre-school going children. A Complete Randomized Design with two experimental sorghum porridge formulations comprising sorghum-maize-soybean (SMS) at 45%, 25% and 30 % respectively; sorghum-soybean (SS) at 70% and 30%, and a control treatment (MM) with 100% maize were prepared and fed to children, divided into two groups for each treatment, daily for four months. Anthropometric measurements including weight, height, and mid upper arm circumference (MUAC) were taken monthly for each child. At the end of 4 months, children fed on SMS blended porridge had the highest gains in weight (2.0 kg), height (2.2cm) and MUAC (10.9 mm). The SS gave the second-best gains in weight (1.4 kg), height (1.5 cm), MUAC (8.5 mm). MM porridge alone without soybean fortification gave the least gains in weight (0.9 kg), height (1.3 cm) and MUAC (8.0 mm). The differences in mean weight, height and MUAC among the three treatments were statistically significant ($p \leq 0.05$). The study concluded that soybean fortified sorghum porridge formulation improved the nutritional status of the pre-school children and recommends its use in school feeding programs to promote health and nutrition of schoolchildren.

Key Words: Sorghum porridge formulations, feeding trial, Pre-School children, Nutritional status.

Effect of Biochars Mixed with Different Phosphorus Rates on Selected Soil Chemical Properties in Western Kenya.

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Abstract

Low maize production in acrisols and ferralsols soils due to phosphorus fixation possess a challenge to food security in Bungoma county, Kenya. The study aimed to analyze the effect of biochar mixed with different phosphorus rates on selected soil chemical properties in the study areas on maize yields. The agronomic evaluation of the biochars and P fertilizers was carried out in two successive wet seasons of long rains and short rains of 2023 on maize crops (Zea mays L.) in Kibabii site (Acrisols) and Chwele site (Ferralsols) through field experiments using a split plot design with three replicates. Biochar sources were the main plots and the subplots assigned phosphorus rates. Biochar was applied at a rate of 5 t ha^{-1} at planting alongside three phosphorus fertilizer rates (0, 13, and 26 kgP/ha). Nitrogen was applied at the rate of 75kgN/ha in split applications. Hybrid 513 from Kenya Seed Company, was planted in all the sites at a spacing of 75 cm x 25 cm. Soil chemical properties (pH, total N, SOC and available P) and maize grain yields were analyzed. Data collected were subjected to repeated measures analysis of variance (ANOVA) using GenStat 14th edition 2012 and means separated by Least Significant Difference (LSD) for different parameters. The results revealed phosphorus fertilizer rate (P-rate) was the most significant factor affecting maize yields. It accounted for 30% of the variation, with a highly significant effect ($p \leq 0.001$). Biochar sources alone also had a significant influence on grain yield ($p \leq 0.037$), though the effect was much smaller compared to phosphorus fertilizer. The interaction between biochar and P-rate was not significant ($p \leq 0.413$), suggesting that the two factors did not synergistically influence yield under the tested conditions. The analysis of correlations between soil chemical characteristics and maize performance (grain yield) revealed varying degrees of association. Grain yield was positively correlated with available phosphorus ($r = 0.5169$) but negatively associated with soil pH ($r = -0.3340$), and soil organic carbon (SOC) ($r = -0.1132$). This study concludes that phosphorus fertilizer is the dominant factor influencing maize yield in Kibabii and Chwele soils, with biochar providing modest benefits and seasonal variability exerting strong moderating effects. Soil chemical characteristics further highlight the importance of phosphorus and nitrogen as key drivers of maize productivity, while imbalances in soil pH and organic carbon may undermine maize yield potential. The interaction between phosphate fertilizers and biochars can be studied in multivariate long-term experiments especially in vast soil types and agroecological zones.

Phenotypic Evaluation and Genetic Mapping of Smut Disease Resistance in Napier Grass (*Pennisetum Purpureum*)

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Abstract

Napier grass (*Pennisetum purpureum*) is an important perennial forage crop supporting smallholder dairy production systems in sub-Saharan Africa, particularly in Kenya. However, its productivity is severely constrained by smut disease caused by *Ustilago kamerunensis*, which results in significant yield and forage quality losses. Existing management approaches are largely ineffective and unsustainable for smallholder farmers, highlighting the need for development of resistant varieties. This study aims to evaluate phenotypic variation in smut disease resistance and identify genomic regions associated with resistance in Napier grass. Specifically, the study will: (i) quantify disease incidence, severity and progression among 200 Napier grass accessions under controlled inoculation; (ii) identify and validate Simple Sequence Repeat (SSR) markers associated with smut resistance; and (iii) map quantitative trait loci (QTLs) linked to resistance traits for potential use in marker-assisted breeding. The experiment being conducted under controlled screen house conditions at the Kenya Agricultural and Livestock Research Organization (KALRO), Kabete Centre, using a randomized complete block design. Disease assessment will include incidence, severity scoring, latent period and Area Under Disease Progress Curve (AUDPC). Molecular characterization will involve genomic DNA extraction, SSR marker analysis and marker-trait association studies, while QTL mapping will be performed using sequencing-derived SNP data. The study is expected to identify resistant Napier grass genotypes, validate molecular markers associated with smut resistance and detect QTLs linked to resistance traits. The findings will contribute to improved understanding of the genetic basis of smut resistance and support marker-assisted breeding for development of smut-resistant Napier grass varieties, thereby enhancing sustainable forage production and smallholder dairy productivity.

Evaluation of Sugarcane Tops-Based Feed Rations for Enhanced Dairy Production among Smallholder Farmers in Malava Sub-county, Kakamega County, Kenya.

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Abstract

Dairy farming is the most rapidly changing sub-sector of agriculture in Kenya, making up 6-8% of the nation's Gross Domestic Product and effectively reducing poverty. Agriculture serves as a fundamental pillar for both urban and rural populations, offering financial stability, employment, and nutritional assurance for smallholder farmers. This study aimed at evaluating sugarcane tops based feed technologies for enhanced feed availability among small holder farmers in Malava Sub-county, Kakamega County Kenya. The specific objectives of the study were to assess the nutritive value of various sugarcane tops based feed rations as

utilized by the farmers and to quantify seasonal availability of animal feeds The study adopted a descriptive survey research design which focused on small holder dairy farmers within the sugarcane belt region. A simple random sampling technique was adopted to collect the necessary data. A sample population of 385 dairy farmers owning between 1 and 5 dairy cows and grow or utilize sugarcane tops were interviewed. Data collection was done using questionnaires, interview guide, secondary data and other key stake holders' records. Data was analyzed using descriptive statistics to determine the frequency distribution for the demographic profiles of participants. The data was tabulated using frequencies and percentages. The data was then interpreted and presented in the form of tables, figures and graphical column charts. Key findings revealed that SCT (29.7%), crop residues (25.2%) and green feeds from roadside, weeds and crop thinning (24.5%) were the dominant feed sources that while SCTs alone are insufficient, their combination with energy or protein-rich forages significantly improved their nutritional profile, 100% SCT control ration had the lowest Crude Protein (CP) at 5.1% while those who supplemented with desmodium or dairy meal reported average increase in milk yield of 1.5–2.3 liters/cow/day. This finding provided real time information that will enable small holder dairy farmers to sustainably utilize sugarcane tops as alternative source of dairy cattle feeds.

Keywords: Dairy farming, sugarcane tops, feed technologies, smallholder farmers, nutrition, Kenya, socio-economic development.

SESSION THREE

Environmental Conservation and Climate Resilience: Sustainable natural resource management, climate change adaptation, and disaster risk reduction

Agroecology: From Evidence to Policy - Shrub Based IntercroppingSystems for Food Security and Biodiversity Conservation in theLakeBasin Region of Kenya

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Abstract

Agroecology practices that integrate intercropping, conservation of biodiversity, andecosystem services are increasingly being adopted worldwide. However, they remaininsufficiently documented in Kenya, which hampers their adoption by farmers andpolicymakers in the lake-basin economic block (LREB). This study examined two shrub-basedintercropping systems, three-tier and two-tier, to assess their potential to enhance foodsecurity and biodiversity within agroecological zones adjacent to the Kakamega Forest ecosystem and provide evidence for policy action in agroecology. The study usedarandomized block design during the 2023 long-rains season, focusing on productivity frompartial land equivalent ratios (PLER) and soil health as ecosystem services of achieving foodsecurity and natural control of destructive soil nematodes. An evidence-based policy onagroecology was formulated using the Weiss typology and stakeholder engagement toprovide a roadmap for sustainable agriculture in the region. Intercropping showed a 70%reduction in land use while achieving higher yields (558.3 kg/ha to 6432 kg/ha) comparedtotraditional maize/bean systems yielding 4022.5 kg/ha. Among the intercrop combinations fromCamphor basil, Cowpeas, NERICA-rice, Maize, or Soybeans—those involving Camphor basil and Cowpeas showed the highest resilience, with PLER values of 1.597 and 1.230respectively. Notably, nematode counts exhibited a significant decline ($p<0.05$) for *Pratylenchus* and *Meloidogyne* species, suggesting an improvement in soil health status. Ashrub-based three-tier intercropping system provides enhanced ecosystemservices andhigher biodiversity, making it suitable for wider farmer adoption with facilitative agroecologypolicies. The study developed a Vihiga County Agroecology Policy (2025), which is Kenya'ssecond following Muranga County. It prioritizes soil health, biodiversity conservation, market access through public-private-producer-partnerships (4Ps) and natural resource mapping for decision-making. Other counties in LREB, such as Kakamega, Nandi and Homabay, are alsodeveloping similar agroecology policies based on this concept.

Key words: Agroecology, Biodiversity, Cowpeas, Ecosystem Services, Food Security, NERICA-rice, Intercropping, Shrubs.

Soil Health Assessment of Lelaitich Ecosystem in Bomet County, Kenya

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Abstract

Soil physicochemical content play a major role in plant nutrition, soil health, and overall ecosystem functioning. Soil health It is for this reason that in March 2025, disturbed top soil samples (15-30 cm depth) were collected at Lelaitich ecosystem trial site in Bomet County, located located at GPS coordinates of -0.946388°, 35.329166°, with an elevation of 1831 metres. Soil samples submitted for lab analysis were characterized for physical and chemical properties with the main objective of determining its health status. Textural classification indicated Lelaitich soil is clay in the proportion 24% sand, 50% clay and 26% silt, with 1.20 g cm^{-3} bulk density (*Db*), 1.5 cm hr^{-1} soil electrical conductivity (EC), level 7.3% moisture content with soil pH of 5.81, Total N of 0.20% (Kjeldahl digestion method), P (Mehlich III) of 14.2 ppm, K of 0.68% meq (265.2 ppm), 1.32% total organic carbon (TOC), 0.2 meq % (40 ppm equivalent) Ca (Mehlich III), 6.22 meq % (755.73 ppm) Mg, 0.24 meq % Mn, 0.34 ppm Cu, 40.0 ppm Fe, 0.29 ppm Zn, 0.36 meq% Na, while electrical conductivity was 0.2239 mS/cm, and a low Ca/Mg ratio of 1:19. The study concluded that low *Db* (1.20 g/cm^3) signals increased porosity for enhanced water infiltration and retention, sufficient aeration and satisfactory root penetration. Its high clay content leads to water panning, that is prone to flooding. Very low EC (salinity), significantly low moisture content, low TOC, P and Ca in Lelaitich ecosystem soils can be ameliorated by enhanced incorporation of well-composted organic fertilizer amendments, increased acreage cover crops to raise TOC and soil pH. In addition to organic amendments, lime application would correct severe Ca deficiencies for enhanced carbon sequestration, climate change resilience and adaptation.

Keywords: Analysis, health, physicochemical, soil, TOC.

Examining community participation in disaster risk management for food crop development under the changing climate in Siaya County, Kenya

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Abstract

Community involvement in disaster risk management became popular worldwide from 1980s ensued failure of traditional disaster management approaches This has then become a trend in many parts of the world by prioritizing on the community members' capabilities to manage risks such as from climate change. In Siaya County, food crop production has negatively been affected by climate change, increasing food insecurity to 80.7%. This made households engage in different community-based disaster risk management approaches. However, limited community involvement in risk management may reduce collective action and ownership of the formal processes of managing the risks from climate change hence increased losses of food crops and food insecurity in Siaya County. This study examined community participation in disaster risk management for food crop development under the changing climate in Siaya County. The study used descriptive surveys and correlation research designs. A sample size of 385 households was determined through sampling techniques comprising multistage and proportionate. Secondary data were obtained from the publications, Journals, internet sources and newspapers. Descriptive and inferential statistics were used to analyze the involvement of community in various disaster risk management activities using Statistical

Package for Social Scientist (SPSS) Version 20.0 for percentages, frequencies and level of significance while narrative analysis was used to analyze qualitative data. Findings revealed varying levels of significance in community community's participation from a Chi – square test result with p-value of 0.008 at (P>0.05) indicating high statistical significance in participation of the households in prediction, p-value of 0.10 at (P>0.05) indicating lack of statistical significance of the household participation on climatic risk analysis, p-value of 0.08 at (P>0.05) indicated lack of statistical significance of the household participation in planning, p-value of 0.03 at (P<0.05) showing a statistical significance of respondents' participation in implementation of the risk reduction activities, and p-value of 0.15 at (P>0.05) indicating a non-statistical significance in respondents participation in monitoring. This study concludes that community's participation in disaster risk management to enhance food crop development in Siaya County is predominantly concentrated in hazard prediction and implementation of risk reduction activities with limited participation in monitoring, planning and risk analysis. There is therefore need for the county government authorities such as the agricultural extension offices, department of environment and climate change and relevant NGOs to broaden community involvement in all aspects of disaster risk management through capacity building programs for skills and knowledge in climatic disaster risk management for sustainable food crop production and resilient agricultural livelihood.

Key Words: Community participation, Community based Disaster risk management, Food crop development, climate change, Siaya County

Enhancing Usability of Weather Data and Information Using Anticipatory Action Approaches for Improved Livelihoods in Kakamega County, Kenya

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Abstract

Extreme weather events are exacerbated by climate change and endanger Kenya's rural livelihoods. Statistics indicate Kakamega County is experiencing a warming of .16°C/decade, variability of > 10%, loss of crop production of 10–20%, and a poverty rate of 51.3%. Data in these climate shocks is scarce, institutions are disjointed, digital literacy is limited and financing is delayed, all of which are major constraints to community resilience. The National and county governments in Kenya have used the Anticipatory Action Roadmap (2024-2029) and provided KES 5 billion to finance adaptation using localised MMUST meteorological data. All these efforts have not been successful, as they return low advisory activation rates, which is probably because they lack good contextualization, absence of livelihood-specific triggers, and weak integration of the indigenous scientific approach. This study employs a mixed methods design that uses five-year MMUST weather records, combined with cross-sectional surveys (n=281) with farmers, beekeepers, traders, and miners to improve the usability of weather data for anticipatory action. Specific goals are: (a) identify priority stakeholder groups for AA integration; (b) determine livelihood-specific climatic thresholds; (c) develop contextual value-addition strategies for MMUST data; and (d) co-design localized decision-support tools. Project products will include calibrated trigger thresholds; a participatory AA toolkit, two publishable journal articles and a proposal for upscaling this grant. Findings will be useful to smallholder farmers, traders, miners, county planners, and policy makers; future partnerships to scale include KMD and NDMA and climate finance institutions.

Key words: Weather, Anticipatory Action, Livelihoods

SESSION FOUR

Trade, Investment, and Industrialisation: Regional value addition, industrial clusters, entrepreneurship, and market linkages.

Assessing the Impact of Digital Governance Initiatives on Equitable and Inclusive Service Delivery in Kenya: A Case of Kisumu, Busia and Kakamega Counties

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Abstract

This study examines the impact of digital governance initiatives on equitable and inclusive service delivery in Kenya, with particular focus on Kisumu, Busia, and Kakamega Counties. The study employed a convergent parallel mixed-methods design integrating quantitative citizen surveys with qualitative key informant interviews involving ICT officials from the three county governments. Quantitative data was analyzed using descriptive statistics, while qualitative data was subjected to thematic analysis to generate complementary insights.

The findings reveal that county governments in Kenya have made notable progress in the implementation of digital governance systems, resulting in improved efficiency, reduced transaction times, enhanced transparency, and minimized physical congestion in service delivery points. However, despite these gains, significant disparities persist in levels of awareness, accessibility, and utilization of digital services across the three counties. Urban-riented counties such as Kisumu recorded relatively high levels of awareness (83%), whereas predominantly rural and border counties such as Busia reported lower awareness (57%) and limited access (28.5%). The study further established that marginalized populations, including older persons, persons with disabilities, and low-income groups, continue to face exclusion due to inadequate digital inclusion measures. Furthermore, while national digital platforms such as eCitizen, KRA iTax, and SHA have achieved considerable public visibility, county-specific digital services, including business licensing and AGPO portals, remain underutilized. The study identified several barriers to inclusive digital governance, including limited internet connectivity, high data costs, inadequate infrastructure, low levels of digital literacy, technological complexity, and insufficient localization of digital information. The study concludes that achieving inclusive digital governance in Kenya requires citizen-centered policy interventions, sustained investment in digital infrastructure, targeted capacity-building initiatives, and localized public sensitization programs to bridge existing digital inequalities and ensure equitable access to public services.

Keywords: Digital Governance, Inclusive Service Delivery, eCitizen, Kenya, ICT Access, County Governance.

Digital Transformation and E-Commerce Adoption for Financial Inclusion and Growth of SMEs in Kenya

Charles Momanyi, Maengwe Orwaru, Lameck Ondieki Agasa, Ronald Tombe

Abstract

Small and Medium Enterprises (SMEs) remain central to Kenya's economic development and accounting for many businesses. However, many SMEs, particularly those operating in rural and semi-urban settings, continue to experience persistent barriers that limit their sustainability. These include inadequate access to formal credit, limited market reach, low levels of digital literacy, weak business management systems, and slow adoption of digital technologies. This presentation reports on an entrepreneurship and SME development project designed to address these challenges through digital transformation, e-commerce awareness, and financial technology innovation. The project adopted a mixed-methods approach involving a baseline survey of 104 SMEs, qualitative interviews, focus group discussions, statistical analysis using SPSS, thematic analysis. The study further informed the design of a digital platform integrating micro-loan access, an e-commerce marketplace, business management tools, and digital literacy support. Findings showed that business type, location, and e-commerce awareness were important factors influencing adoption of multiple digital payment systems, with e-commerce awareness emerging as a key driver of technology uptake. The project also developed and piloted a functional digital prototype with 50 SMEs, generating baseline evidence, training outputs and policy insights. The results demonstrate that digital platforms can enhance financial inclusion, expand market access, improve business management practices, and strengthen SME resilience. However, challenges such as limited internet connectivity, low digital literacy, and budget constraints must be addressed through offline platform features. The project highlights the importance of stakeholder co-creation, and integrated technological ecosystems in supporting inclusive SME growth. The findings provide practical evidence for policymakers, development partners, researchers, and SME support institutions seeking to promote sustainable digital entrepreneurship in Kenya and comparable emerging economies.

Keywords: SMEs; digital transformation; e-commerce; financial inclusion; digital literacy; Kenya.

SESSION FIVE

Health and Well-being: Public health, disease prevention, healthcare systems, and community health initiatives.

Role of Sports in Health Advocacy: Lessons from Kenya – A Review

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Abstract

Sports and physical activity have increasingly emerged as important tools for health advocacy and public health promotion globally, particularly in developing countries such as Kenya. This review examines the role of sports in health advocacy in Kenya, focusing on how sports initiatives contribute to disease prevention, health promotion, social inclusion, and fundraising for healthcare services. The study employed a narrative review methodology based on secondary data collected from peer-reviewed journal articles, government reports, policy documents, and publications from international organizations between 2010 and 2025. The review analyzed themes related to sports advocacy, policy frameworks, sports-based fundraising initiatives, community health outcomes, and challenges affecting implementation. Findings indicate that sports in Kenya significantly contribute to reducing the burden of non-communicable diseases through the promotion of physical activity and healthy lifestyles. Community sports programs have also enhanced mental health, youth empowerment, gender inclusion, and social cohesion. Major sporting events such as the Standard Chartered Nairobi Marathon, Beyond Zero Half Marathon, Ndakaini Half Marathon, Mater Heart Run, and Lewa Safari Marathon have successfully combined sports participation with fundraising for maternal health, cardiac care, environmental health, and community healthcare services. These initiatives demonstrate the potential of sports to mobilize resources, raise health awareness, and strengthen partnerships among governments, non-governmental organizations, corporations, and communities. Despite these achievements, challenges including inadequate sports infrastructure, insufficient funding, gender inequality, urbanization, and weak policy implementation continue to limit the effectiveness of sports-based health advocacy in Kenya. The review concludes that sports can serve as powerful instruments for advancing public health goals when integrated into national health strategies. The paper recommends increased investment in sports infrastructure, stronger policy implementation, inclusive participation, and enhanced collaboration among stakeholders to maximize the health benefits of sports in Kenya and other developing.

Key words; Sports, Advocacy, Health, Kenya.

Cytokine-CpG Motif Oligodeoxynucleotide Co-inoculation in the Murine Malaria Model

Barasa Mustafa

Abstract:

Malaria is a global problem that affects up to 500 million people and kills hundreds of thousands every year making it a serious global health predicament. Currently, there is only a partially efficacious vaccine licensed for use against malaria and available therapeutic control measures continue to be impeded by the emergence of drug-resistant strains of Plasmodia parasites which cause high morbidity and mortality. Cutting-edge research on anti-malarial mechanisms is intensively focused on biochemical and molecular actors with the

potential of improving vaccination and therapy against malaria. The outcome of host-pathogen interactions, with respect to Plasmodia parasites, is determined by an extremely delicate balance of various biomolecules, cytokines and hostspecific factors. Plasmodia parasites evade immune mechanisms and it is still unclear what exact modulations of the immune system are required in their elimination. Proper understanding of the intricate mechanisms underlying the immunopathogenesis of malaria is an essential component in the development of vaccination and therapeutic interventions. A vast array of immunopotentiating molecules like unmethylated CpG motif oligodeoxynucleotides (ODNs) operate in concert with cytokines to mediate resistance to infections. The CpG ODNs exert potent immunostimulatory effects via nexus with dendritic cell Toll-like receptors (TLRs) like TLR 9 and by activating immune cells like B-cells, plasmacytoid dendritic cells (pDCs) and NK cells. The current project investigated cytokine-CpG motif ODN co-inoculation in BALB/c mice infected with P. berghei ANKA strain. Two BALB/c mice groups were infected with virulent P. berghei ANKA strain parasites, followed by five consecutive days of cytokine-involving CpG ODN-based gene therapies. One of the P. berghei-infected mice groups received IL18-CpG ODN, and another one received IL-12-CpG ODN co-inoculation. Six other control groups with various therapeutic regimens were involved in the study. At ten days postinfection, all mice groups were humanely sacrificed for the extraction of EDTAtreated blood, plasma and splenocyte samples which were used to quantify a plethora of transcription factors (TFs), physiologic biomolecules, haematological and clinical chemistry parameters, chemokines, cytokines, immunoglobulin M (IgM) and splenocyte recall proliferation in a multiplicity of bioassays. Analysis using one-factor ANOVA unraveled cytokine-CpG co-immunotherapy as a strong trigger of antimalarial mechanisms that lead to overall parasitaemia reduction, less dramatic parasitaemia trends, milder clinico-haematological outcomes, and protective patterns in expression of TFs, physiologic biomolecules, chemokines, cytokines, IgM, and antigen-specific splenocyte recall proliferation. Murine recipients of the cytokine-CpG ODN co-inoculation ditherapy manifested with increased levels of NF-kB, NFATc, IRF-5, AhR, KLF and reduced levels of FOX-P3 and STAT-6 TFs. They also had enhanced of anti-Plasmodial activities accompanied by elevations in adiponectin, ANGPT1, NRP-1 and Cox-2 and delevations in Angiogenin, ANGPT2, MMP-8 and MMP-9 physiologic biomolecules. Cytokine-CpG ODN co-injection triggered upregulated concentrations of CCL-2, CCL-5, CXCL-12, CXCL-1, CX3CL-1, recall proliferation SI and downregulated concentrations of CCL-3, CXCL-5, CXCL-10 and CXCL-16. Augmented quantities of IFN-γ, TNF-α, IL-17, IL23a, and IgM repressed measurements of IL-4, and IL-10 were detected with widespread ramifications in the potential of cytokine-CpG-based DNA therapy in counteracting malaria, other infectious diseases and medical conditions.

Improving Prostate Cancer Diagnosis in Resource-Limited Settings Using HOXB13 and Prostein Immunohistochemistry

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Abstract

Background: Prostate cancer is a leading cause of cancer-related morbidity among men in sub-Saharan Africa, where delayed diagnosis contributes to poor outcomes. Conventional diagnostic methods, including prostate-specific antigen (PSA) testing and histopathology, have limitations in poorly differentiated tumors. This study evaluated the diagnostic and prognostic utility of HOXB13 and Prostein immunohistochemical biomarkers in prostate cancer among men in Western Kenya.

Methods: A retrospective cross-sectional study was conducted using formalin-fixed paraffin-embedded prostate tissue specimens. Immunohistochemical staining for HOXB13 and Prostein was correlated with clinicopathological parameters including Gleason score, ISUP grade, pathological stage, PSA levels, and invasion status. Diagnostic performance was assessed using sensitivity, specificity, Cohen's Kappa, ROC curve analysis, and multivariate logistic regression.

Results: The mean patient age was 72.00 ± 0.93 years. Elevated preoperative PSA levels were observed in 97.9% of patients, with 20.8% showing metastatic PSA levels >100 ng/mL. HOXB13 overexpression was significantly associated with high ISUP grade (p = .001), perineural invasion (p = .019), and advanced pathological stage pT3/pT4 (p = .025). HOXB13 demonstrated sensitivity of 87.3%, specificity of 84.8%, Cohen's Kappa of 0.71 (p = .025), and AUC of 0.86 for detecting Gleason ≥7 disease. ISUP high grade independently predicted aggressive disease (OR = 4.12, p = .001). Prostein expression was detected in 97.2% of malignant tissues and all benign prostate tissues, while all non-prostatic tissues were negative. Strong cytoplasmic perinuclear staining predominated in acinar and intraductal adenocarcinoma.

Conclusion: HOXB13 and Prostein are promising immunohistochemical biomarkers for prostate cancer diagnosis in Western Kenya. HOXB13 is associated with aggressive tumor features, while Prostein demonstrates high specificity for prostatic tissue identification. Combined use of these biomarkers may improve diagnostic accuracy and risk stratification in resource-limited settings.

Variations in postnatal care (PNC) interventions provided to newborns in health facilities across Kakamega County, Western Kenya

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Abstract

Background: Neonatal mortality remains high globally, with Kenya reporting a rate of 20 deaths per 1,000 live births. Essential Newborn Care (ENC) is crucial for preventing neonatal deaths, yet the provision of this care for the newborns is varied.

Objective: This study aimed to assess the implementation of targeted postnatal care interventions for newborns and their variation across four scheduled visits at selected health facilities in Kakamega County, Western Kenya.

Methods: This cross-sectional analytical study evaluated the provision of PNC-ENC across four scheduled visits in Kakamega County, Kenya. Data were collected from 325 mothers through structured questionnaires. Descriptive and inferential statistics, including ANOVA, were used to assess care provision.

Results: The overall mean provision of expected newborn interventions across the four visits was 57.82%. Provision was highest at the first visit (59.55%), declined at 2 to 4 weeks (55.16%), improved at 4 to 6 weeks (59.06%), and slightly declined at 4 to 6 months (57.50%).

Conclusions: This study highlights gaps in the delivery of essential newborn care, particularly in physical examinations. Targeted interventions, including training and resource allocation, are recommended to improve provision to PNC care interventions and reduce neonatal mortality

Key words: Newborns, targeted postnatal care, Western Kenya.

Capacity building for frontline healthcare workers on Emergency Obstetric andNewbornCare in Bungoma County, Kenya.

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2. Dr Sally Oronje - SONMAPS
3. Dr Wilfrida Bore – SONMAPS

Abstract

Emergency Obstetric and Newborn Care (EmONC) remains a critical strategy for reducingmaternal and neonatal morbidity and mortality globally, particularly in low- and middle-incomecountries (World Health Organization [WHO], 2022). In Kenya, frontline healthcare workers arecentral to the delivery of quality maternal and newborn healthcare services; however, persistent gaps in skills, staffing, and health system support continue to affect service delivery outcomes (Ministry of Health Kenya, 2021). This baseline study assessed the capacity of frontlinehealthcare workers in the provision of Emergency Obstetric and Newborn Care in BungomaCounty, Kenya. The study sought to establish the existing knowledge and competenciesofhealthcare workers, assess training exposure, evaluate the availability of essential EmONCequipment and supplies, and identify challenges affecting service delivery.

A descriptive cross-sectional study design was adopted involving frontline healthcare workersfrom selected health facilities across Bungoma County. Data were collected using structuredquestionnaires, observation checklists, and key informant interviews. Quantitative data wereanalyzed using descriptive statistics, while qualitative findings were analyzed thematically.

The findings revealed considerable gaps in the capacity of frontline healthcare workerstoprovide comprehensive EmONC services. Although most respondents possessed basiconemergency management, many had not received recent in-service training on EmONC, consistent with findings from similar studies in sub-Saharan Africa (UNFPA, 2020). Deficiencies were particularly noted in the management of obstetric emergencies suchaspostpartum hemorrhage, eclampsia, neonatal resuscitation, and obstructed labor. The studyfurther identified shortages of essential medicines, equipment, and skilled personnel, alongsideweak referral systems and inadequate supportive supervision, factors that negativelyaffect maternal and newborn outcomes.

The study concludes that significant capacity gaps exist among frontline healthcare workersinBungoma County, limiting effective delivery of EmONC services. Strengthening continuousprofessional development, mentorship, staffing, infrastructure, and supply of essential commodities is necessary to improve maternal and neonatal health outcomes and support progress toward universal health coverage and Sustainable Development Goal 3.

Developing A University-Wide Mental Health Screening and Referral Program for Students at Masinde Muliro University of Science and Technology

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Background: Mental health challenges among university students is an increasing public health concern worldwide. University students are particularly vulnerable due to academic pressure, financial difficulties, and social transitions. In Kenya, depression and anxiety are prevalent among students, yet many cases remain undetected and untreated. At MMUST, the lack of a formal screening and referral framework has contributed to delayed identification and management of students experiencing psychological distress. This study therefore aimed to develop, pilot, and evaluate a structured mental health screening and referral program tailored to university students.

Methods: A cross-sectional survey of 300 students was conducted using the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder-7 (GAD-7) to assess prevalence and associated risk factors. Stratified random sampling ensured representation across different schools and years of study. Findings informed the development of a context-specific screening tool and a structured referral pathway linking students to counseling and external clinical services.

Results: Results showed that 114 students (38.0%) screened positive for moderate to severe mental health challenges, while 34.0% had depressive symptoms and 32.0% had anxiety symptoms. Additionally, 28.0% experienced both depression and anxiety. Students reporting high academic workload were more likely to experience mental health challenges than those with lower workloads (56.4% vs. 26.4%, $p < 0.001$). Psychoactive substance users also showed significantly higher prevalence rates (61.4% vs. 29.0%, $p < 0.001$).

Conclusion: Mental health challenges were common among university students. High academic workload and psychoactive substance use were strongly associated with poor mental health, highlighting key intervention areas.

Implications: There is need to institutionalize routine screening and strengthen referral systems within university settings in low-resource contexts like Kenya.

Key words: *Mental Health, Generalized Anxiety Disorder, psychoactive substance, referral tool*

IPCC: A Model for Integrating Preconception Care Services for Improved Maternal and Neonatal Outcomes

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Abstract

Background: Preconception care (PCC) offers an opportunity to identify and address biomedical, behavioural, psychosocial and social risks before pregnancy. However, PCC is not routinely integrated into Kenya's community and primary health care system.

Objective: To develop an integrated community–facility PCC model for women and couples planning pregnancy in Kenya.

Methods: The model was informed by quantitative preconception risk profiling, in-depth interviews with prospective parents, focus group discussions with Community Health Promoters (CHPs), and key informant interviews with primary care providers in Kisumu County. Qualitative data were analysed thematically and triangulated with quantitative findings to identify priority risks, acceptable services, provider roles, referral needs and implementation requirements.

Results: Quantitative findings demonstrated multiple modifiable preconception risks, including abnormal BMI, chronic illness, substance use, psychosocial stress, domestic violence, environmental exposures, STI-related symptoms and immunization gaps. Prospective parents perceived PCC as preparation for pregnancy and valued couple counselling, male involvement, screening, nutrition counselling, IFAS, mental health support and respectful in-person care. CHPs viewed themselves as trusted household-level entry points for PCC and supported roles in community sensitization, basic counselling, risk screening, referral and follow-up. Primary care providers identified feasible facility-based services, including HIV testing, blood pressure and blood sugar screening, blood grouping, Rhesus factor assessment, history taking, physical examination, IFAS provision, lifestyle counselling and referral. Key barriers included low PCC awareness, male partner resistance, cultural beliefs, stigma, SHA payment challenges, commodity stock-outs, limited IEC materials, training gaps and weak referral feedback.

Conclusion: Findings support a Kenya-specific integrated community–facility PCC model that begins with CHP-led community sensitization and household identification, links women and couples to trained primary care providers for comprehensive PCC assessment, and maintains continuity through referral feedback and follow-up. The model is risk-based, couple-centred, culturally sensitive and aligned with Kenya's community health and primary care platforms. Further stakeholder validation and multisite pilot testing are recommended.

NLP Framework for Automated Symptom Severity Staging in Heart Failure and COPD Clinical Notes Using Ontology Integration: A Study Protocol

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Abstract

Heart failure (HF) and chronic obstructive pulmonary disease (COPD) remain among the leading causes of morbidity and mortality globally, with disease management heavily dependent on accurate severity staging using the New York Heart Association (NYHA) and Global Initiative for Chronic Obstructive Lung Disease (GOLD) classification systems. However, severity information is commonly embedded within unstructured clinical narratives rather than structured Electronic Health Record (EHR) fields, limiting automated clinical decision support, disease surveillance, and retrospective analytics. Existing Natural Language Processing (NLP) approaches largely rely on rule-based keyword matching or supervised deep learning models requiring extensive annotated corpora, which are often unavailable in many health systems. Furthermore, current methods inadequately integrate clinical ontologies for semantic reasoning and explainable severity classification. This study addresses the need for an ontology-guided NLP framework capable of automated HF and COPD symptom severity staging from unstructured clinical notes.

Objective: This study aims to develop and evaluate an ontology-integrated NLP framework for automated extraction and severity staging of HF and COPD symptoms from de-identified clinical notes using NYHA and GOLD classification systems.

Methods: The study will adopt a Design Science Research (DSR) methodology to design, implement, and evaluate a hybrid NLP framework integrating rule-based keyword extraction, SNOMED-CT ontology reasoning, and a Bi-LSTM-CRF deep learning architecture for clinical sequence labeling. The framework will be developed and tested using approximately 1,000 de-identified clinical notes sampled from publicly available repositories including MIMIC-III/IV, eICU Collaborative Research Database, AmsterdamUMCdb, and MTSamples. Clinical text preprocessing will involve tokenization, lemmatization, dependency parsing, abbreviation expansion, and negation detection. Ontology-guided semantic normalization will map extracted symptom entities to standardized SNOMED-CT concepts. Framework performance will be evaluated using precision, recall, F1-score, Cohen's Kappa, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), confusion matrices, and correlation analyses against confirmed diagnoses and guideline-based severity staging.

Expected Outcomes: The proposed framework is expected to automate NYHA and GOLD severity staging across heterogeneous clinical note types without reliance on manually annotated severity labels. The ontology-integrated architecture is anticipated to improve clinical interpretability, semantic consistency, and explainability of NLP outputs while enhancing EHR-based analytics, retrospective clinical audit, and disease surveillance capabilities. The study also aims to demonstrate the feasibility of scalable AI-assisted severity classification in data-rich but label-poor clinical environments.

Conclusion: This protocol presents a hybrid ontology-guided NLP framework for automated HF and COPD severity staging from unstructured clinical narratives. By combining deep learning and semantic reasoning approaches, the framework has the potential to contribute to scalable AI-assisted clinical decision support, improve interoperability of clinical documentation, and support evidence-based healthcare analytics in both high-resource and resource-constrained settings.

Community Health through Physical Activity and Nutritional Counselling Among Geriatrics during Covid-19 Pandemic in Kakamega County Interventions Kenya

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GRANT REFERENCE NUMBER: MMU/URF/2022/1-054

The global aging population continues to rise, with projections indicating that by 2050 older persons will exceed 2.1 billion. Most old people lead sedentary lifestyles and face malnutrition, which contributes to frailty, chronic disease, and loss of independence. This study assessed the effectiveness of community health interventions of physical activity and nutritional counselling on functional independence among geriatrics in Kakamega County amidst the COVID-19 pandemic. A quasi-experimental design targeted 402 participants across twelve sub-counties, using snowball sampling. Community health volunteers delivered a twelve-week home-based physical activity program alongside nutritional counselling and 24-hour dietary recall assessments. Data were collected using the International Physical Activity Questionnaire Short Form and analyzed with SPSS v24 through ANOVA, dependent t-tests, and regression analysis. At baseline, 72% of participants were classified as sedentary, while 64% showed protein and micronutrient deficiencies. After the intervention, physical activity levels improved with 68% of participants moving into the moderate-to-high activity category. Functional independence scores increased by 23%, with notable gains in mobility and balance ($p < 0.05$). Nutritional counselling improved dietary diversity, with mean caloric adequacy rising from 1,450 kcal/day to 1,950 kcal/day, and protein intake increasing by 18%. Regression analysis confirmed that combining physical activity and nutritional counselling produced a 31%. In conclusion, community-based physical activity and nutritional counselling are effective, low-cost strategies for enhancing functional independence and nutritional status among geriatrics in resource-poor settings, even during public health crises. The study suggests incorporating physical activity and nutrition education into county health promotion efforts, improving capacity development of community health promoters, and improving allocation of resources for geriatric health. There is a need for further longitudinal studies to evaluate the long-term effects on morbidity and quality of life.

***Key Words**: Health, Physical Activity, Nutritional Counselling, Community, Geriatrics*

SESSION SIX

Infrastructure and Sustainable Urban Development: Transport, housing, water, sanitation, and renewable energy solutions.

The Paradox of Active Transport: Environmental Quality as a Critical Moderator of Transport Mode and Health Outcomes in Kibra, Kenya

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Abstract

Rapid urbanisation in emerging economy has accelerated the environmental degradation of informal settlements, raising concerns about the sustainability of active transport and its associated health benefits. The study assessed how the quality of the environment moderates the relationship between transport mode and health outcomes in Kibra, one of the largest informal settlements in Nairobi. Led by ecosystem models of health, the study adopted a quantitative cross-sectional design, focusing on 400 travelers using Cochran's formula for infinite populations. The data were analyzed using the Partial Least Squares Structural Model (PLS-SEM) approach for the estimation of direct and moderating effects. The results showed that transport modes ($\beta = 0.769$, $p < 0.001$) and environmental quality ($\beta = 0.559$, $p < 0.001$) had a strong positive and significant impact on health outcomes, accounting for 90 per cent of the difference ($R^2 = 0.900$).Environmental quality significantly moderated this relationship ($\beta = 0.061$, $p = 0.034$), suggesting that improved environmental conditions increase the health benefits of active transport, while poor air quality, noise and discomfort detracts from these benefits. The findings address the paradox that although walking and cycling are health-promoting activities, their benefits are reduced in polluted environments. The study concluded that the improvement of active transport needs to be combined with improvements in the environment in order to optimise the health outcomes of cities. Integrated policy measures addressing non-motorised transport infrastructure, air quality management and environmental hygiene are essential to mitigate structural inequalities and to promote urban sustainability in informal settlements.

Keywords: Active transport; environmental quality; health outcomes; informal settlements; PLS SEM; Urban Sustainability

A Data Driven Study through Real Time Monitoring of Energy Usage at MMUST: A Potential for Replicable Models

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Abstract

As public learning institutions in Kenya expand both in terms of student population and infrastructure, so does the overall energy consumption. This expansion in turn translates directly into higher energy costs. At the same time, global energy security remains unstable while capitation from the exchequer is ever reducing, which means these institutions are

forced to spend scarce resources towards energy bills. It is therefore critical that these institutions make deliberate efforts to embrace and implement best practice in energy and environmental sustainability. This project focuses on a practical, data-driven approach to improving energy efficiency and system reliability in public learning institutions, using Masinde Muliro University of Science and Technology (MMUST) as a pilot study., The study responds to rising energy costs, frequent power disruptions, infrastructure strain, and the growing need for institutions to adopt cleaner and more sustainable energy practices. The project combined real-time energy monitoring and data visualization to identify sources of operational power wastage and technical losses. Data loggers were installed at some selected sites on the main campus which provided high-resolution data points, these included logs of, power consumption, frequency, voltage, current, power factor and energy. The results revealed that there is significant potential for major improvements. The findings show that targeted interventions could significantly improve on energy efficiency and consumption and position MMUST as a replicable model.

Keywords: *energy efficiency, energy consumption, public learning institutions, energy monitoring, energy management*

Hierarchical Reinforcement Learning for Wind Farm Wake Steering: A FLORIS-Based World Model Approach

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Abstract

Operating a wind farm requires coordinating individual turbines to maximize total energy capture while minimizing the aerodynamic wake losses that downstream machines suffer. Wake steering via turbine yaw control can mitigate these losses, but the farm-scale control problem is nonstationary, high-dimensional, and temporally delayed: actions at upstream turbines produce effects minutes later downstream, which defeats greedy, per-turbine strategies. We present the Octopus-HRL Agent, a hierarchical reinforcement learning framework for adaptive wind farm control that decomposes farm management into temporally extended skills and a meta-level policy. Key components include a multi-cortex perception system, a learned Dynamic Skill Graph (DSG) that structures and sequences skills, cascaded memory networks to bridge long time delays, and a differentiable meta-learning mechanism for continual adaptation. Implemented on the FLORIS wake simulator, the agent uses Soft Actor-Critic policies inside an Options architecture; a meta-controller selects skills from the DSG while predictive models forecast spatiotemporal wind propagation. We introduce a reward formulation that trades off power gain, actuator fatigue, and yaw-rate penalties, and we accelerate learning with a curriculum driven by a Proxy of Interestingness via Entropy (POIE) heuristic. On a four-turbine test case, Octopus-HRL achieves sustained power improvements of +25.5% over baseline greedy control under steady conditions, with average episodic gains of +320 kW to +343 kW. Learned yaw strategies produce asymmetric wake deflections that reduce downstream exposure while preserving upstream capture, demonstrating the framework's potential for practical, farm-scale energy optimization.

Enhanced adsorption of bamboo-based hydrochar via Fenton oxidation for defluoridation of water: Optimization, operational parameters, regeneration, cost analysis and mechanistic insights

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Abstract

In this contribution, response surface methodology (RSM) was used to optimize the porosity architecture of bamboo-based pristine hydrochar (PH) with temperature, solid-to-liquid ratio, and time as input variables. Three Fenton-modified hydrochars (FH-1, FH-2, and FH-3) were synthesized via Fenton oxidation under progressively increasing H_2O_2 oxidant (2, 4 and 6 %) and ferrous sulphate catalyst dosages (0.82, 1.63 and 2.45 g), respectively, to evaluate the effect of oxidation intensity on the textural properties, surface chemistry and adsorbent performance for the removal of aqueous fluoride ions. The adsorbents were characterized using FTIR, BET, TGA and pHpzc. Specific surface area (SSA) was unaffected by oxidation intensity. The indistinguishable SSAs were accompanied by progressive increase in adsorption capacity denoting the dominant role of functional group density over textural properties. The equilibrium data was best described by the Sips isotherm model, with maximum adsorption capacities of 637, 649, 692, 894 mg/g for PH, FH-1, FH-2 and FH-3, respectively. Kinetic data was described by the pseudo-second-order model. The lack of direct correlation between adsorption rate, denoted by k_2, and textural or isotherm parameters imply diffusion-controlled processes. Thermodynamically, the process was spontaneous ($\Delta G < 0$), exothermic ($\Delta H < 0$), physical ($\Delta H < 40$ kJ/mol), and enthalpy driven. Competing anions inhibited fluoride adsorption in the order $CO_3^{2-} > HCO_3^- > NO_3^- \approx Cl^- > SO_4^{2-}$. A treatment cost of 0.307 KES/L was estimated for the first time with over 85% efficiency in 5 cycles of adsorbent regeneration using hot water.

Keywords: Fenton oxidation; bamboo hydrochar; adsorption, cost estimation, oxidation intensity

Integrated Bio-Sanitation Technology for Reduction of Fecal Water Pollution and Climate-Resilient Resource Recovery in Secondary Schools of the Lake Victoria Basin, Kenya

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Abstract

Unsafe sanitation and poor wastewater management contribute significantly to fecal contamination, environmental pollution, and waterborne disease risks in Kenyan schools. Integrated Bio-Sanitation Technology (IBST) is a decentralized sanitation approach combining anaerobic wastewater treatment, fecal sludge stabilization, biogas generation, wastewater reuse, and pollution control. This study presents preliminary findings from an ongoing quasi experimental PhD intervention study evaluating the effectiveness of IBST in reducing fecal contamination in secondary schools within the Lake Victoria Basin, Kenya. The study involved ten purposively selected secondary schools, with five intervention schools receiving IBST systems and five comparable schools serving as controls. Water quality monitoring was conducted at baseline and during follow-up assessments over a 12-month period. Parameters analysed included *Escherichia coli* (E. coli), total coliforms, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and turbidity. Descriptive statistics, paired comparisons, graphical trend analysis, and exploratory Difference-in-Differences approaches were applied. Baseline findings revealed detectable fecal contamination in both study groups. Mean baseline E. coli concentrations were higher in intervention schools than controls (202.4 CFU/100 mL versus 10.2 CFU/100 mL), while mean total coliform concentrations were 1080.2 CFU/100 mL and 778.3 CFU/100 mL respectively. Follow-up assessments demonstrated progressive reductions in E. coli, total coliforms, and turbidity levels within intervention schools. Paired analyses between baseline and 12-month measurements showed reductions in contamination indicators, with turbidity approaching statistical significance (paired $t = 2.712$; $p = 0.053$; 95% CI: −0.12 to 5.48). Some intervention groups achieved greater than 2-log microbial reductions under stable operational conditions.

The findings provide preliminary evidence that IBST may improve environmental sanitation, support wastewater reuse and biogas generation, and strengthen climate-resilient WASH interventions in resource-constrained school settings.

Keywords: Bio-sanitation, fecal contamination; *E. coli*, climate resilience, wastewater reuse.

Effectiveness of an Eight-Week Exercise Therapy Programme on Lumbago Management among Staff at Masinde Muliro University of Science and Technology

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Abstract

Lumbago presents a significant challenge as one of the most common musculoskeletal disorders affecting working populations globally, particularly among university staff that faces risks from prolonged sitting. In Kenya, there is lack of empirical data on structured exercise interventions for this group with existing treatments primarily focusing on pharmacological solutions or unsupervised exercises, which often neglect the multifaceted nature of lumbago. This study aims to assess the effectiveness of exercise therapy intervention programme on

lumbago management specifically designed for staff at (MMUST). It seeks to evaluate the prevalence of lumbago, severity, low back related physical fitness assessment and the effect of eight-week exercise therapy programme among MMUST staff. Employing a quasi-experimental pre-test–post-test design, the study will compare baseline and post-intervention results from staff members diagnosed with lumbago. Participants will be recruited through purposive sampling to identify staff with lumbago who meet the inclusion criteria until the required sample of 30 participants is achieved, with initial assessments screening eligible participants to ensure the inclusion criteria is met using a prevalence screening checklist, pain intensity via the Numeric Pain Rating Scale and low back related fitness indicators and core strength, using a standard fitness testing protocol. The program will feature supervised exercise therapy sessions conducted three times weekly with each session led by a qualified exercise therapist. Data will be collected at baseline and after eight weeks, with quantitative analysis conducted using descriptive statistics and paired t-tests to identify significant changes. The study aims to establish that well-structured exercise therapy regime is superior to commonly practiced routine. These findings are expected to bolster the integration of exercise therapy into university occupational health programs, providing a framework for workplace wellness policies and improved management strategies for lumbago, thereby enhancing the productivity, well-being, and life quality of university staff in Kenya.

Key words: Lumbago, exercise therapy, MMUST

Development Pathways for Sustainable Aviation Fuels (SAF) from Yellow Oleander (*Thevetia Peruviana*) in Arid and Semi Arid Lands (ASALs) In Kenya

Peter O. Odhiambo, Dr. J.O. Owino, Prof. F.Orata Omoto, Dr. Tecla Sum Psumaand F.Mwangi

Abstract

Thevetia peruviana commonly known as Yellow Oleander belongs to family Apocynaceae is native of Peru and West Indies. T.peruviana is a potential bioenergy crop especially in the arid to semi-arid land (ASALs) in Kenya. The seed kernels contain over 60% of non-drying pale yellow oil, about 30% of crude proteins and about 8% of biologically active compounds (glycosides). The oil has physical and chemical parameters comparable to commonly used feedstocks such as used cooking oil (UCO), cotton, castor and other non- edible feeds tocks. The seed oil can be converted into sustainable aviation fuels through Hydrotreated Esterified Fatty Acids (HEFA) and co-processing pathways. The proposed development pathway include identification of actual SAF developer, off take agreements with feedstock growers, agro-processors, aggregators, transporters, distributors, marketers and actual SAF end-users like Kenya Airways in Kenya. Cultivation of T.peruviana is targeting at least 10% of arid to semi-arid lands (ASALs) in the agro- ecological zones 5-7 which accounts for over 70% of arable land in Kenya. At least 1-10% of this land area can be targeted for cultivation of Yellow Oleander with minimal or zero indirect land use change (ILUC). This targets about 32 counties found in ASAL regions including counties found in Lake Region Economic Block counties.

Key words: Thevetia peruviana, sustainable aviation fuels, feedstocks, HEFA and Co-processing, ASALs, ILUC.

Poster presentation

S.No.	Presenter	Title	Institution
1	Meshack R., Wafula, F. N. Muyekho, E. M'mbone Muleke, L. Samita Wamocho, J. Wanjala Munyasi, A. I. Hoka	Exploiting Polyploidy in Napier Grass *(Cenchrus purpureus* Schumach) for Increased Forage Yield.	Masinde Muliro University of Science and Technology
2	Charles Nundu, Otokoma R.[1]Wakhungu JW, Munyasi JW,Muyekho Francis	Evaluation of Sugarcane Tops-Based Feed Rations for Enhanced Dairy Production among Smallholder Farmers in Malava Sub-county, Kakamega County, Kenya.	Masinde Muliro University of Science and Technology
3	Wandolo O. Levis, Sebastian Chanzu	Afya BioWatch System: A Smart Biosafety Incident Reporting and Surveillance System in Resource-limited Settings	Masinde Muliro University of Science and Technology
4	Prof. Francis Orata Omoto	The Ultimate Super-phosphate Fertilizer	Masinde Muliro University of Science and Technology
5	Prof. Francis Orata Omoto	“Zero Waste" Approach in the Sugarcane Industry: Maximize Benefits from the Circular Economy.	Masinde Muliro University of Science and Technology
6	John Kirimi M’Rraiji	The Stigmatization of Substance Abuse Rehabilitation and the Role of Storytelling Interventions.	Masinde Muliro University of Science and Technology
7	Wanjala C., Buhere P., Nyongesa P., Cherop P., Owino J., Bukhala P., Ali U., Omukunda E.	Effects of Artisan Gold Mining on Human Health in Ikolomani Sub-County, Kenya	Masinde Muliro University of Science and Technology
8	Dr. Minyoso Jemimah, Dr. Nelima Mary Lyani, Prof. Ondiek Alala Bennedict	Digital Portfolio Management and Financial Performance of Unit Trust Funds in Kenya.	Masinde Muliro University of Science and Technology
9	Stanley Omuterema Oluchiri & Lucy Mandillah	Nature’s Heritage: Protection Of Indigenous Trees And Shrubs For Medicine, Culture, And Ecology	Masinde Muliro University of Science and Technology
10	A. Okoth., L.Mandillah., B. Alala., R. Ruto., S.Usolo	An Evaluation Of Gender Mainstreaming Policies And Practices At Masinde Muliro University Of Science And Technology	Masinde Muliro University of Science and Technology
11	R.Onamu., J. Muoma., V. Ogemah., MG Kariaga., E.Mmbone., A. Ndiema., U. Samoeyi, M.Mukolwe	Enhancing the Capacity of Masinde Muliro University of Science and technology in Promoting Coffee Production in western kenya	Masinde Muliro University of Science and Technology
12	Favour Lihondo, Gershom Mutua, Rahab Kamau	Phytochemical Profiling and Antimicrobial Potential of Selected Medicinal Plants in Kakamega County	Masinde Muliro University of Science and Technology
13	Everlyne N. Morema, Morris Senghor, Robert Egessa, Collins Ouma	Health facility Reseadiness for implementing Preconception Care in Kisumu County, Kenya	Masinde Muliro University of Science and Technology
14	Everlyne Morema, Claudia Hanson, Morris Senghor	Perceptions and acceptability of preconception care among prospective parents in Kisumu County, Kenya	Masinde Muliro University of Science and Technology

SPECIAL THANKS TO:

Guests

Prof. Shaukat Abdulrazak

PS State Department for Science, Research, and Innovation in Kenya

Dr. Dickson Andala

CEO National Research Fund

Dr. David Ngigi

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