



HIS EXCELLENCY HON. PRESIDENT UHURU KENYATTA, C.G.H.  
President and Commander in Chief of the Armed Forces of the Republic of Kenya



HIS EXCELLENCY HON. WILLIAM SAMOEI RUTO  
Deputy President of the Republic of Kenya



**KENYA NATIONAL ANTHEM**

O God of all creation  
Bless this our land and nation  
Justice be our shield and defender  
May we dwell in unity  
Peace and liberty  
Plenty be found within our borders.

(Verse: 2)

Let one and all arise  
With hearts both strong and true  
Service be our earnest endeavour  
And our homeland of Kenya  
Heritage of splendour  
Firm may we stand to defend.

(Verse: 3)

Let all with one accord  
In common bond united  
Build this our nation together  
And the glory of Kenya  
The fruit of our labour  
Fill every heart with thanksgiving.

**EAST AFRICAN ANTHEM**

(Verse: 1)

Ee Mungu *twakuomba* ulinde  
Jumuiya Africa Mashariki  
Tuwezeshe kuishi kwa amani  
Tutimize na malengo yetu

(Chorus)

Jumuiya Yetu sote tulinde  
Tuwajibike tuimarike  
Umoja wetu ni nguzo yetu  
Idumu Jumuiya yetu.

(Verse: 2)

Uzalendo pia mshikamano  
Viwe msingi wa Umoja wetu  
Natulinde Uhuru na Amani  
Mila zetu na desturi zetu.

(Verse: 3)

Viwandani na hata mashambani  
Tufanye kazi sote kwa makini  
Tujitoe kwa hali na mali  
Tuijenge Jumuiya bora

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**CIRIS 2021 INTERNATIONAL CONFERENCE** *Organizing Committee*

**Secretariat:**

Patron: Prof. Simiyu Sitati  
Chairperson: Josphat Sawe  
Co-chairperson: James Mwangi

**Technical Committee:**

Magdalene Mwachofi  
Emmanuel Sawe  
Johana Suge  
Reuben Chemitei

**Finance Committee:**

Josphat Sawe  
Richard Sang

**Logistics Committee:**

Emmanuel K. Meres  
James Mwangi  
John Gitau

**Organising Committee:**

Emmanuel K. Meres  
James Mwangi  
Magdalene Mwachofi  
Emmanuel Sawe  
Johana Suge  
Belinda Chelagat  
Jane Kiprono  
Raphael Murei  
David Chepkangor  
Laurence Kosgei  
Jimmy Chepng'oswo  
David Allube  
Reuben Chemitei  
Jonathan Ng'eno  
Danold Rotich  
Agrivinah Nzoika  
Paul Barmao  
Jacinta Muthuri



**Prof. Simiyu Sitati  
The Chair,  
Governing Council,**

**The Eldoret National Polytechnic**

**THE CABINET SECRETARY: MINISTRY OF EDUCATION,  
THE PRINCIPAL SECRETARY; STATE DEPARTMENT OF  
TECHNICAL AND VOCATIONAL AND EDUCATION TRAINING,  
THE CEO: TVETA, THE DIRECTOR GENERAL; KNQA,  
THE GOVERNOR OF UASIN GISHU COUNTY,  
MEMBERS OF THE GOVERNING COUNCIL, OUR HONORABLE  
GUESTS, TRAINERS, STUDENTS, LADIES, AND GENTLEMEN**

I wish to welcome all of you to the Eldoret National Polytechnic for this year's annual conference on **Competencies in Research and Innovation for Sustainable Development**. I am here representing the Governing Council of The Eldoret National Polytechnic. The Council is the supreme governing body of the institution. Its principal mandate is to oversee the activities and operations of the Polytechnic on behalf of the government. In this regard, the council is concerned with the setting of broad policy directions for the institution and to follow up on how these policies are being executed by the management and staff.

LADIES AND GENTLEMEN,

As the reporting agency to government, the council is responsible for the approval of the budget and the performance contract. The council is also considered as the employer on behalf of the government and the management and so it employs staff both teaching and non-teaching staff to fill any gaps that may arise. The council is also responsible for ensuring that there are adequate structures in place for efficient and effective teaching and learning. With the growing number of students, this has become a real challenge. We build

classrooms and laboratories and thing that they are now sufficient but the next year the principal tells us that the student numbers have swelled and more are needed.

LADIES AND GENTLEMEN

The student population has continued to increase and I am reliable informed that The Polytechnic now has over 17,000 students. The governing council, has to ensure that a conducive learning environment is nurtured and maintained, especially now the whole world is facing the global pandemic of COVID-19. To achieve a conducive environment for training during this challenging times, The Eldoret National Polytechnic has invested a lot of resources, in order to adhere strictly to the Ministry of Health protocols. Several areas for hand washing have been put in place from the gate and around all the learning areas, also automatic sanitizer dispensing machines have been put outside all the learning rooms. We can say that our college is fairly safe from the pandemic since the prevention measures put in place are being followed. So far we do not have any reported case, especially from our students.

LADIES AND GENTLEMEN;

The Eldoret National Polytechnic is an ISO 9001:2015 certified institution. This certification has ensured that all employees are aware of our processes and procedures and are following them. this has made the management of the Polytechnic easy and that is why we keep posting good results. Here, we are all committed to providing high quality technical training research, and innovation activities. This conference is a testament to this commitment. At the same time, we have innovations from our students and trainers which you are free to view in the exhibition tents.

LADIES AND GENTLEMEN,

Since inception of this Polytechnic thirty two years ago, The Eldoret National Polytechnic has encouraged and supported activities that would make our communities better. This is why we have partnered with our neighbors in the community for instance to offer accommodation to our students, and others like the jua kali association to exhibit with us. Other companies hold their training here, field days and sporting activities. So we have farmer's field days, Brookside company dairy farmers' trainings and even the inter-County Sports have been held in our fields. We look forward to more partnerships and collaborations and pray that the exchange of ideas and sharing of knowledge during this conference will yield better solutions to the many challenges facing our country today.

THANK YOU ALL, FEEL AT HOME AND ENJOY YOUR STAY IN OUR COLLEGE





**Josphat K. Sawe,  
The Chief Principal,  
The Eldoret National Polytechnic  
CABINET SECRETARY: MINISTRY OF EDUCATION,  
THE PRINCIPAL SECRETARY; STATE DEPARTMENT OF  
TECHNICAL AND VOCATIONAL AND EDUCATION TRAINING,  
THE CEO: TVETA,  
THE DIRECTOR GENERAL; KNQA,  
THE GOVERNOR OF UASIN GISHU COUNTY,  
OUR GOVERNING COUNCIL CHAIRMAN,  
MEMBERS OF THE GOVERNING COUNCIL,  
OUR HONORABLE GUESTS,  
OUR TRAINERS,  
STUDENTS  
LADIES AND GENTLEMEN**

Welcome to our 10<sup>th</sup> international conference on Competencies in Research, science and innovations for sustainable development. We are here once more to give our contribution to the research world in our own small way. Research remains one of the most fundamental services offered by The Eldoret National Polytechnic. It is not only a requirement for students to carry out research for their KNEC examinations but Research goes in tandem with the high quality technical training that we offer here at The Eldoret National Polytechnic. Our Vision of striving **To be a Centre of Excellence in Technological Advancement** has constantly propelled us to keep improving our training and research programs. That is why we are here today. It is in line with this that we are now offering online classes in some of our programs such as Diploma in Business management, Diploma in Supply Chain Management as well and in the Department Health Sciences. We have a full-fledged e-learning department that has been training our staff and students on how to conduct these online

classes. This goes hand in hand with our online journal publication launched a few years ago.

LADIES AND GENTLEMEN,

Going by our mission, **to produce innovative trainees for a dynamic economy** and in line with the new education curriculum, we have found it necessary for the polytechnic to partner with the industry. Some of the companies we have partnered with include the sugar industries such as Nzoia and Chemelil sugar companies; the Coca Cola Company and Kenya Seed Company for our Agriculture trainees. On health, our health Sciences department offers Pharmacy and Medical laboratory Technology among others. For these courses, we have partnered with the Moi Teaching and Referral Hospital. Our trainees go for attachment in these places and later on get employed there; while medical personnel come to train our trainees in various health science fields. Through this partnership, we are making our contribution to health care especially needed now to help combat the Covid 19 pandemic. In line with this, all our staff received the first dose of vaccination against the Covid 19. Medical personnel conducting the vaccination came to our institution since our staff population is high. We are waiting to receive the second dose and we are happy to hear that the vaccines have arrived.

LADIES AND GENTLEMEN,

On housing, we have partnered with DITTMAN construction Company, BOWEN Building Contractors, various county governments, the Ministry of Road and Public Works, Lake Victoria North Water Services Board, Kenya Power Company, KENGEN and Athi River Mining Cement Company limited, just to mention a few of our partners. In addition, the Jua kali association Eldoret chapter are our partners too where we have a Memorandum of Association with them. We have offered them a platform to showcase their innovations during this conference. Our building and civil engineering department has been well equipped for all training to do with construction of buildings, roads and water works. This has been made possible by our partnership with CICAN (Colleges and Institutes of Canada) for the KEFEP (Kenya Education for Employment Program).

LADIES AND GENTLEMEN,

On food security, we offer training in Agriculture through our Applied Sciences department and the Hospitality, Nutrition and Dietetics department. Both are registered with the necessary statutory bodies just like all other departments. If you seek services from the major hotels around Eldoret, you are likely to be served by alumnus of our college. Beyond Eldoret, you will find our graduates all over the country and beyond. These partnerships have ensured 85% placement of our graduates nationally and internationally.

LADIES AND GENTLEMEN,

Through research forums like this and the different innovations being created, it is my hope that we shall create our own Kenyan Covid 19 vaccine. Why not? The Polytechnic has been making its own sanitizer since the Covid 19 pandemic came up. Our sanitizer is fully approved by Kebs so it is an approved product. We do not buy sanitizers but use our own. This is why we feel motivated to continue organizing and hosting this annual international conference. This is our tenth. We could not hold one last year since our country was on lock down due to the Covid 19 pandemic. I have seen that some of the research papers to be presented in this conference do have an aspect of some of the challenges experienced during this pandemic. This is a step in the right direction in addressing this challenge and the many others that we are going through.

LADIES AND GENTTLEMEN,

I am delighted to welcome all of you to this conference, and look forward to reading and sharing in some of your research works. Feel welcome and free to share with the other researcher so that we can help each other to grow as scholars.

THANK YOU AND ENJOY YOUR TIME HERE.



**Magdalene Mwachofi,  
HOD Research, Partnerships and Network Development  
CABINET SECRETARY: MINISTRY OF EDUCATION,  
THE PRINCIPAL SECRETARY; STATE DEPARTMENT OF  
TECHNICAL AND VOCATIONAL AND EDUCATION TRAINING,  
THE CEO: TVETA,  
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THE GOVERNOR OF UASIN GISHU COUNTY,  
OUR GOVERNING COUNCIL CHAIRMAN,  
MEMBERS OF THE GOVERNING COUNCIL,  
OUR CHIEF PRINCIPAL,  
OUR HONORABLE GUESTS,  
MY FELLOW TRAINERS,  
STUDENTS  
LADIES AND GENTLEMEN**

This is a unique year for us. We are still affected by the Covid 19 pandemic, yet it has not stopped us from having this conference. Most institutions the world over have since last year opted to hold virtual conferences. But we are here today. No matter the challenges we are all going through, research has to continue. In fact, the pandemic offers an opportunity for research in a variety of areas. Some of the papers being presented in this conference do have an element of the challenges experienced and posed by the pandemic.

**LADIES AND GENTLEMEN,**

New challenges call for new research opportunities and so we included them in our conference sub-themes. A new area of interest in Kenya today is Child care and protection. This area has not been given the necessary weight it deserves. The Eldoret National Polytechnic introduced this course two years ago. A lot of interest has been shown in the program and many papers on children issues will be presented in this conference. So are other gender issues being experienced

every day in our society. Inclusion of these areas in our call for papers gave us many papers from different authors. We appreciate them all.

LADIES AND GENTLEMEN,

Our *Journal of Technology and Socio-Economic Development* is still being published, both hard copies and the online version. Both versions are registered with ISSN (International Standard Serial Number), the registering body for all scholarly works in the world. Please get yourself a copy of this year's volume that we are going to launch before you leave. The publication takes us a step further in the scholarly world since all the papers published will henceforth be accessed by any one across the world. It is this reason that scholars keep coming back to us.

LADIES AND GENTLEMEN,

I thank the Governing Council, and the Chief Principal for their continued support and commitment to the success of research in our polytechnic. Without their support, we would not be here today. I thank my fellow trainers who have continued to support this conference by being the front line presenters. This year, the number of our trainers presenting papers in this conference had increased considerably. I am proud to be a part of this hard working and committed team. Members of the technical team have ensured that this conference is well organized.

LADIES AND GENTLEMEN

The researchers and presenters who are here today and will be here tomorrow give me great joy. Without them, there really would be no conference. They are our honored guests. And to all our stakeholders, I say thank you. We shall keep up our commitment to all of you to keep this conference going year after year. Welcome to our parallel sessions after this plenary gathering and add some your thoughts to the various research works being presented. We appreciate your contributions. They will help mold better researchers and better research works.

THANK YOU ALL.

**CIRIS 2021 INTERNATIONAL CONFERENCE** Programme schedule

**DAY ONE:** Wednesday, 2<sup>nd</sup> June, 2021

<b>TIME</b>	<b>PROGRAMME</b>	<b>VENUE</b>
<b>0800-1400:</b>	<b>Registration of participants at the</b>	<b>Registration tent</b>
<b>0900-0930:</b>	<b>Registration desk</b>	<b>Principal's office</b>
<b>0900-0930:</b>	<b>Welcome of Guests and signing of</b>	<b>Polytechnic</b>
<b>0900-0930:</b>	<b>visitors' book</b>	<b>environment</b>
<b>0930-1030:</b>	<b>Tour of The National Polytechnic</b>	<b>Hospitality (HC)</b>
<b>1030-1300:</b>	<b>Housekeeping announcements</b>	<b>Big tent</b>
<b>1300-1400:</b>	<b>Health Break</b>	<b>Complex</b>
<b>1400-1600:</b>	<b>Opening Ceremony and Plenary</b>	<b>Big tent</b>
<b>1600-1630:</b>	<b>Session</b>	<b>Complex</b>
<b>1630:</b>	<b>Lunch</b>	<b>HC Ground Floor</b>
	<b>Parallel Session One</b>	<b>HC First Floor</b>
	<b>Health Break</b>	<b>HC Ground Floor</b>
	<b>End of day one</b>	

**DAY TWO:** Thursday, 3<sup>rd</sup> June, 2021

<b>TIME</b>	<b>PROGRAMME</b>	<b>VENUE</b>
<b>0800-1000:</b>	<b>Registration of participants at the</b>	<b>Registration Tent</b>
<b>0830-1030:</b>	<b>Registration desk</b>	<b>HC First Floor</b>
<b>1030-1100:</b>	<b>Parallel Session Two</b>	<b>HC Ground Floor</b>
<b>1100-1330:</b>	<b>Health Break Plenary Session and</b>	<b>Big tent</b>
	<b>Presentation of certificates</b>	<b>)</b>
<b>1330-1430:</b>	<b>Official Closing Ceremony</b>	
<b>1430:</b>	<b>Vote of thanks</b>	
	<b>Closing prayer</b>	
	<b>Kenya National Anthem</b>	
	<b>Lunch</b>	<b>HC Ground Floor</b>
	<b>Departures</b>	

**CIRIS 2021 INTERNATIONAL CONFERENCE** *Detail Programme schedule*

<b>DAY ONE: Wednesday, 2<sup>nd</sup> June, 2021</b>	
<b>TOUR OF THE ELDORET NATIONAL POLYTECHNIC BY THE CHIEF GUEST AND OTHER INVITED GUESTS</b>	
<b>TIME</b>	<b>ITEM</b>
0800 - 1400	<b>Registration</b> Registration of participants at the registration desk
0900 - 0930	<b>Welcome</b> Welcome of guests and signing of visitors' book in the Principal's office <ul style="list-style-type: none"><li>▪ Brief introductions</li><li>▪ Sharing programme</li></ul>
0930 - 1000	Tour of the Eldoret National Polytechnic and planting of trees
1000 - 1030	<b>HEALTH BREAK</b>

DAY ONE: Wednesday, 2 <sup>nd</sup> June, 2021	
OPENING CEREMONY OF THE ELDORET NATIONAL POLYTECHNIC 10 <sup>TH</sup> CIRIS 2021 INTERNATIONAL CONFERENCE	
TIME	ITEM
0800 - 1400	Registration of participants at the registration desk
0900 - 0930	Welcome of Guests and signing of visitors' book at the Principal's office Tour of the National Polytechnic by: <b>Hon. Prof. George A. O. Magoha</b> , Cabinet Secretary: Ministry of Education, Science and Technology, Republic of Kenya
0930 - 1000	<b>HEALTH BREAK</b>
1000 - 1300	<p><b>Plenary session I</b>                      <b>Venue:</b> Big tent <b>Opening ceremony MC:</b> <b>Mr. Emmanuel Meres</b>, Deputy Principal Administration</p> <ul style="list-style-type: none"> <li>▪ Opening prayer by <b>Mrs. Jane Kiprono</b></li> <li>▪ Kenya National Anthem,</li> <li>▪ Brief on the 10<sup>th</sup> Annual CIRIS 2021 international conference by <b>Mrs. Magdalene Mwachofi</b>, Technical committee chair, 10<sup>th</sup> annual CIRIS 2021 international conference/HOD Research, Partnerships and Networking Development</li> <li>▪ Welcome address by <b>Mr. Josphat Sawe</b>, Chairperson 10<sup>th</sup> annual CIRIS 2021 international conference, Chief Principal, The Eldoret National Polytechnic.</li> <li>▪ Message from <b>Prof. Simiyu Sitatii</b>; Patron 10<sup>th</sup> CIRIS 2021 international conference and the chair of the Governing Council, The Eldoret National Polytechnic</li> <li>▪ Address by <b>His Excellency Jackson Mandago</b>; Governor, Uasin Gishu County, Republic of Kenya.</li> <li>▪ Remarks by the <b>Principal Secretary</b> State Department of Vocational, and Technical Training, Ministry of Education, Republic of Kenya.</li> <li>▪ Speech, Launching of <i>Volume IX of the Journal of Technology and Socio-economic Development</i> and official opening of the 10<sup>TH</sup> annual CIRIS 2021 International Conference by <b>Hon. Prof. George A. O. Magoha</b> Cabinet Secretary: Ministry of Education, Science and Technology, Republic of Kenya.</li> </ul>



	<p>Keynote speakers, chair: <b>Mr. Josphat Sawe</b>, Chief Principal TENP</p> <ul style="list-style-type: none"> <li>▪ 1<sup>st</sup> Keynote address: <b>Hon. Prof. George A. O. Magoha</b>, Cabinet Secretary: Ministry of Education, Science and Technology, Republic of Kenya.</li> <li>▪ 2<sup>nd</sup> Keynote address: <b>Prof Walter O. Oyawa</b>, CEO, National (NACOSTI)</li> <li>▪ 3<sup>rd</sup> Keynote address: <b>Dr. Juma Mukhwana</b>, Director General, Kenya National Qualification Framework (KNQA)</li> <li>▪ 4<sup>th</sup> Keynote address: <b>Dr. Kipkirui Langat</b>. CEO, Technical, Vocational Education, and Training Authority, (TVETA), Kenya</li> <li>▪ 5<sup>th</sup> Keynote address: <b>Dr. Lawrence Mitonga Guantai</b>. CEO, Curriculum Development Assessment and Certification Council (CDACC), Kenya</li> </ul>
1300 - 1400	<b>LUNCH BREAK</b>
1400 – 1630	Break-out into Parallel sessions 1 - 5
1630 – 1700	<b>HEALTH BREAK</b>
1700 -	End of day one

**CIRIS 2021 INTERNATIONAL CONFERENCE** *Detail Programme schedule*

<b>DAY TWO: Thursday, 3<sup>rd</sup> June, 2021</b>	
<b>TIME</b>	<b>ITEM</b>
0800 - 0830	Registration of participants at the registration desk
0830 – 1030	Parallel session II (A –E)
1030 – 1100	<b>HEALTH BREAK</b>
1100 - 1400	<p><b>Official Closing Ceremony Venue: Big tent</b>  <b>Plenary session II</b>  <b>MC: Mr. Emmanuel Meres</b>, Deputy Principal - Administration</p> <ul style="list-style-type: none"> <li>▪ Address by <b>Mr. James Mwangi</b>, Deputy Principal Academics.</li> <li>▪ Address by <b>Mr. Josphat Sawe</b>; Chairperson 10<sup>th</sup> annual CIRIS 2021 international conference, Chief Principal, The Eldoret National Polytechnic</li> </ul> <p><b>Official Closing Ceremony</b></p> <ul style="list-style-type: none"> <li>▪ Presentation of certificates and official closing of the 10<sup>th</sup> annual CIRIS 2021 International conference</li> <li>▪ Vote of thanks: <b>XXXXX</b></li> <li>▪ Closing prayer: <b>Mr. David Allube</b></li> <li>▪ Kenya National Anthem</li> </ul>
1300 - 1400	<b>LUNCH BREAK</b>
1430 -	<b>DEPARTURE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

CIRIS 2021 INTERNATIONAL CONFERENCE DAY ONE	
DAY ONE: Wednesday, 2 <sup>nd</sup> June, 2021.	
PARALLEL SESSION I (A)	
<p><b>Sub-Theme:</b> Agricultural sciences for food security &amp; sustainable development  <b>Venue:</b> HN 1  <b>Chair:</b> Dr.Paul Barmao  <b>Rapporteur:</b> Joel Kiplimo</p>	
TIME	TITLE
1400 - 1420	Contributions of climatic smart agricultural practices on adaptation to climate change among small holder farmers in Nyaribari Chache Sub-county, Kisii county: - <i>Nyamwamu Charles</i>
1420 - 1440	Assessment of socio-economic viability of Improved <i>Kienyeji</i> Chicken production using sorghum-based rations in Semi-Arid regions of western Kenya: - <i>Manuya, E. M., Rachuonyo H. A., Were B. A., Gudu S. and Nyangweso P. M.</i>
1440 - 1500	Analysing the effects of agricultural technologies on agriculture and food security: - <i>Iren kidali</i>
1500 - 1520	Analysis of the structure, conduct and performance of Irish potatoes marketing in Kisii central sub-county, Kisii County, Kenya: - <i>Ondieki Cynthia Kerubo, Geoffrey Amusala</i>
1520 - 1540	Strategies of reducing postharvest losses during storage of grain crops to strengthen food security in Kenya: - <i>Joel Atsali Amunga</i>
1540 - 1600	Design and fabrication of combined maize thresher and cob gridding machine: - <i>John Chomba</i>
1600 - 1620	Time series analysis and forecasting of the number of diabetes mellitus and hypertensive patients in Uasin Gishu County, Kenya: - <i>Jeremiah Kiplagat and Reuben Chemitei</i>
1620 - 1640	Attitudes, perception, and effects of Euthanasia on Families in wetlands in Kenya: - <i>Justine Amadi Orucho and Orucho Mark Roders</i>
1640 - 1710	<b>HEALTH BREAK</b>
1710 -	<b>END OF DAY ONE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

<b>DAY ONE: Wednesday, 2<sup>nd</sup> June, 2021.</b>	
<b>PARALLEL SESSION I (B)</b>	
<p><b>Sub-Theme:</b> Education innovations, delivery, management and technology for sustainable development</p> <p><b>Venue:</b> HN 3</p> <p><b>Chair:</b> Dr. Andrew Saina</p> <p><b>Rapporteur:</b> Mr Jezreel</p>	
<b>TIME</b>	<b>TITLE</b>
1400 - 1420	Unmasking the relevance of technical, vocational education and training (TVET) in Kenya: - <i>Nyongesa Lumuli Charles and Sanny A. Mabele</i>
1420 - 1440	Civic education for democratic voting system in Kenya: - <i>Gilbert Nyakundi Okebiro</i>
1440 - 1500	Effective biology practical use in pedagogy: A classroom experience: - <i>Isaac Christopher and Odawa Imanda</i>
1500 - 1520	Relationship between teachers' competencies and learners' achievement of linguistic skills: a case of public secondary schools in Bungoma County, Kenya: - <i>Dr. Matere Audrey</i>
1520 - 1540	Role of online training on service delivery of waiters in licensed hotels in Nairobi County: - <i>Ogweyo Peter Ogalo</i>
1540 - 1600	Towards sustainable education in Kenya: Integration of science technology and Mathematics in secondary educational: - <i>James Ondieki Ratemo and Evelyn Njurai</i>
1600 - 1620	Influence of ICT on skill development in technical and vocational training institutions in Kenya: A case of western region: - <i>Sanny A. Mabele and Nyongesa Lumuli Charles</i>
1620 - 1640	Gender representation and career choices in TVET: A thematic analysis of the case of the Eldoret National Polytechnic, Uasin Gishu Kenya: - <i>Anita Kosgei and Reuben K. Chemitei</i>
1640 - 1710	<b>HEALTH BREAK</b>
1710 -	<b>END OF DAY ONE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

<b>DAY ONE: Wednesday, 2<sup>nd</sup> June, 2021.</b>	
<b>PARALLEL SESSION I (C)</b>	
<b>Sub-Theme:</b> Cross - cutting	
<b>Venue:</b> HN 6	
<b>Chair:</b> Dr. Clare Muhuha	
<b>Rapporteur:</b> Eliud Bett	
<b>TIME</b>	<b>TITLE</b>
1400 - 1420	Financial impact of COVID-19 crisis on investor income: A case of investors in real estate in Kisii County: - <i>Dennis Nyamasege</i>
1420 - 1440	The role of TVET in creating innovative response during and after the COVID-19 era: - <i>Dr. Anne A. Obinju and Mr. Charles L. Yogo</i>
1440 - 1500	Psychological factors influencing men's participation in family planning practices in Kakamega County, Kenya: - <i>Dr. Mildred Lumayo</i>
1500 - 1520	COVID-19 pandemic opportunities for development of herbal alternatives for sustainable health: - <i>Isaac Inganga</i>
1520 - 1540	TVET opportunities and challenges and its effect on TVET transformation, a case study of Eldoret National Polytechnic Uasin Gishu County Kenya: - <i>James Mwangi</i>
1540 - 1600	Attitudes, perception and effects of euthanasia on families in wetlands in Kenya: - <i>Justine Amadi Orucho and Orucho Mark Roders</i>
1600 - 1620	Preventive interventions of obstetric fistula in Kenya, social work's perspective: - <i>Justine Amadi Orucho and Mark Rodgers Orucho</i>
1620 - 1640	Challenges Facing Writing of Research Papers in TVET Institutions. A Case of Study Students in the Eldoret National Polytechnic: - <i>Maroa Gospel Mwita, Rumba Charles Lewa, and Raphael Murei</i>
1640 - 1710	<b>HEALTH BREAK</b>
1710 -	<b>END OF DAY ONE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

<b>DAY ONE: Wednesday, 2<sup>nd</sup> June, 2021.</b>	
<b>PARALLEL SESSION I (D)</b>	
<b>Sub-Theme:</b> ICT and Engineering for sustainable development	
<b>Venue:</b> HN 7	
<b>Chair:</b> Dr. Patrick Kere	
<b>Rapporteur:</b> Josphat Kolum	
<b>TIME</b>	<b>TITLE</b>
1400 – 1420	Root cause analysis of critical failure Modes. A case study of olkaria 2 Geothermal power plant in Kenya: - <i>Koech Dorice Chepkemoi</i>
1420 – 1440	Electrical engineering trainers’ pedagogy and its influence on trainees’ performance in technical education: an exploratory study of technical training institutes in Kenya: - <i>Omae Magwaro Jackson</i>
1440 – 1500	Benefits of adoption of biomimicry for sustainable building and construction industry in Kenya: - <i>Francis Wanga</i>
1500 – 1520	Innovative design of self-loading grains miller (Poshomill): - <i>Furaha Kevin and Rotich D. Kipkoech</i>
1520 – 1540	Open source LMS selection framework for higher learning institutions: A case of selected public universities in Kenya: - <i>Emily Chepkorir, Harrison Bii and Damaris N. Odera</i>
1540- 1600	Production of bio plastics from maize starch: - <i>Mdzomba E.M, Koech Dorice and Ngeno G.K</i>
1600 - 1620	An implementation of automated class attendance system based on facial detection and recognition: - <i>Emmanuel Sawe</i>
1620 - 1640	Computational modeling of selected toxic molecular products from the thermal degradation of a selected light cigarette brand: - <i>Alfayo Maiyo, Joshua Kibet, Ambrose K. Kiprop</i>
1640 -1710	<b>HEALTH BREAK</b>
1710 -	<b>END OF DAY ONE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

<b>DAY ONE: Wednesday, 2<sup>nd</sup> June 2021.</b>	
<b>PARALLEL SESSION I (E)</b>	
<b>Sub-Theme:</b> Business economics, human resources, leadership and governance	
<b>Venue:</b> HN 8	
<b>Chair:</b> Jane Kisinyo	
<b>Rapporteur:</b> Joshua Sisimwo	
<b>TIME</b>	<b>TITLE</b>
1400 – 1420	Influence of access to resources on sustainable financial performance of small and medium enterprises in Uasin Gishu County: - <i>Belinda Chelagat</i>
1420 – 1440	Effect of investment policy on the financial performance of savings and Credit cooperatives societies in the banking sector in Kenya: - <i>Dr. Hannah Kiaritha</i>
1440 – 1500	Financial rewards and employee’s performance in impact sourcing companies in Kenya: Case of cloudfactory Kenya limited: - <i>Susan Kabuki and Loice Koskei</i>
1500 – 1520	Effect of working conditions on sustainability of service delivery in devolved health services in Kericho County: - <i>Lily Cherono Kitur</i>
1520 – 1540	Influence of CDF management actions about the auditor general report on financial accountability among Njoro constituency development fund (CDF) in Kenya: - <i>Stanley Kiptarus, John Gathii and John Tanui</i>
1540 -1600	Determinant of women participation in community development projects in Kakamega County: - <i>Musabi Antony Barasa</i>
1600 - 1620	Employment opportunities and youth participation in county development projects in Kakamega County: - <i>Musabi Antony Barasa</i>
1620 – 1640	Social rewards and employee’s performance in impact sourcing companies in Kenya: Case of cloudfactory Kenya limited: - <i>Susan Kabuki and Loice Koskei</i>
1640 - 1710	<b>HEALTH BREAK</b>
1710 -	<b>END OF DAY ONE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

<b>DAY ONE: Wednesday, 2<sup>nd</sup> June 2021.</b>	
<b>PARALLEL SESSION I (F)</b>	
<b>Sub-Theme:</b> Cross - Cutting	
<b>Venue:</b> HN 9	
<b>Chair:</b> James Mwangi	
<b>Rapporteur:</b> Janet Isoka	
<b>TIME</b>	<b>TITLE</b>
1400 – 1420	Assessing strategic gender needs of technical and vocational training institutes in Uasin Gishu county: The case of Eldoret National Polytechnic: - <i>Jane Kiprono, David Chepkangor, Frederick Agengo, Patrick Kere, Susan Keino and Faith Yego</i>
1420 – 1440	Natural resources management and sustainable development. A case of Kisii soapstone, Tabaka region: - <i>Maosa Robert</i>
1440 – 1500	Overcoming gender and development challenges: Lessons learnt from women in the lake Bogoria agro pastoralists communities, Kenya: - <i>Ogendi G. M. and Ondieki R. N.</i>
1500 – 1520	Pine tree as a source used to lit charcoal stoves and a renewable energy for sustainable development: - <i>Gilbert Nyakundi Okebiro</i>
1520 – 1540	Teachers’ perceptions on the factors affecting implementation of early childhood education curriculum in Changamwe, Mombasa, Kenya: - <i>Onyango, Daniel Oduor</i>
1540 -1600	Awareness level of pupils on CSA in EMESA Sub-location, Kisii County: - <i>Orucho Justine Amadi, Onyiko Kennedy Karani and Joseph Misati</i>
1600 - 1620	Assessing the quality of TENP services and customer satisfaction: - <i>Jane Kiprono and Raphael Murei</i>
1620 - 1640	Determinants of youth participation in county development agenda in Kakamega County: - <i>Musabi Antony Barasa</i>
1640 - 1710	<b>HEALTH BREAK</b>
1710 -	<b>END OF DAY ONE</b>



CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

CIRIS 2021 INTERNATIONAL CONFERENCE	
DAY TWO	
DAY TWO: Thursday, 3 <sup>rd</sup> June, 2021.	
PARALLEL SESSION I (A)	
<b>Sub-Theme:</b> Agricultural sciences for food security& sustainable development	
<b>Venue:</b> HN 1	
<b>Chair:</b> Dr. Bosire	
<b>Rapporteur:</b> Mercy Chebet	
TIME	TITLE
0830 – 0850	Effects of electronic waste disposal on environmental conservation in Kenya critical review: - <i>Victor Juma</i>
0850 – 0910	Influence of post-harvest technology on food security in Narok East Sub - County, Narok county, Kenya: - <i>Asige Mmaitisi Lawrence</i>
0910 – 0930	Role of institutional capacity and technological practices in implementation of food security projects in Hamisi sub-county, Vihiga county, Kenya: - <i>Obushe Dennis Omuse</i>
0930 - 0950	Rangeland rehabilitation and enhancement of livelihoods using adaptable grass ecotypes in Baringo South, Baringo County: - <i>Silas Kasitet and Ogendi G. M.</i>
0950 – 1010	Effect of hydrocolloid gum on the pasting properties of corn and cassava starches: - <i>Virate Kiprop</i>
1010 - 1030	Principle component analysis of the effects of effluents from Mumias sugar factory on water quality of river Nzoia, Kenya: - <i>Weling A. Martin</i>
1030 – 1100	<b>HEALTH BREAK</b>
1100 – 1330	<b>CLOSING CEREMONY</b>
1330 - 1430	<b>LUNCH BREAK</b>
1430 -	<b>DEPARTURE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

DAY TWO: Thursday, 3 <sup>rd</sup> June, 2021.	
PARALLEL SESSION I (B)	
<b>Sub-Theme:</b> Education and training for sustainable development	
<b>Venue:</b> HN 3	
<b>Chair:</b> Virate Kiprop	
<b>Rapporteur:</b> Rutto Sitienei	
TIME	TITLE
0830 - 0850	Strengthening TVET and industry linkages for sustainable development: - <i>Barasa Silali Anthony, Isaac Getange Matundura and Augustine Simiyu</i>
0850 - 0910	The influence of teachers' enthusiasm and instructional methods on learners' performance in ward secondary schools in Misungwi district, Mwanza region, Tanzania: - <i>Anna Nassu and Onyango Daniel Oduor</i>
0910 - 0930	Collaboration with Industry to train Technical Skills in TVET Institutions. A case study of Uasin Gishu County: - <i>Joseph Okwaro Athenus, David K. A Chepkangot, Rosalind N. Githinji</i>
0930 - 0950	Tourism, hospitality, and leisure in a post-pandemic world: - <i>Hillary Arusei</i>
0950 - 1010	Pedagogical approaches employed in electronic learning in the corona pandemic time: A case of selected tertiary institutions in Kisii County: - <i>Joan K. Nyachiro</i>
1010 - 1030	Globalization in education, exchange programs and collaborations for sustainable development: - <i>Rose Khamusali Okwemba<sup>1</sup>, Bonciana Lisanza</i>
1030 – 1100	<b>HEALTH BREAK</b>
1100 – 1330	<b>CLOSING CEREMONY</b>
1330 - 1430	<b>LUNCH BREAK</b>
1430 -	<b>DEPARTURE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

<b>DAY TWO: Thursday, 3<sup>rd</sup> June, 2021.</b>	
<b>PARALLEL SESSION I (C)</b>	
<b>Sub-Theme:</b> Cross-cutting	
<b>Venue:</b> HN 6	
<b>Chair:</b> Robert Onyango	
<b>Rapporteur:</b> Kunusia	
<b>TIME</b>	<b>TITLE</b>
<b>0830 –0850</b>	A discourse construction of gender in selected Lubukusu initiation songs: - <i>Pamella N. Wanjala</i>
<b>0850 – 0910</b>	Ways of reducing challenges of sexual abuse in Kenya: - <i>Beryl Wanga and Francis Wanga</i>
<b>0910 – 0930</b>	Determining the impacts of COVID-19 in Kenya: - <i>Godner Bwari Peter</i>
<b>0930 - 0950</b>	Prevalence of child sexual abuse among pupils in Kisii County: - <i>Onkundi Elizabeth Kwamboka and Orucho Justine Amadi</i>
<b>0950 - 1010</b>	Challenges of using ODEL for students in technical education departments in technical and vocational education training institutions in Kenya: - <i>Ephantus Mugo and Rodah Sitati</i>
<b>1010 - 1030</b>	Adoption of solar energy and diffusion of new solar technology products for domestic and commercial use in Kenya: Critical analysis: - <i>Shivambo Amos</i>
<b>1030 – 1100</b>	<b>HEALTH BREAK</b>
<b>1000 – 1330</b>	<b>CLOSING CEREMONY</b>
<b>1330 - 1430</b>	<b>LUNCH BREAK</b>
<b>1430 -</b>	<b>DEPARTURE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

<b>DAY TWO: Thursday, 3<sup>rd</sup> June, 2021.</b>	
<b>PARALLEL SESSION I (D)</b>	
<b>Sub-Theme:</b> Health and applied sciences for sustainable development	
<b>Venue:</b> HN 7	
<b>Chair:</b> Jacinta Muthuri	
<b>Rapporteur:</b> Shadrack Yebei	
<b>TIME</b>	<b>TITLE</b>
<b>0830 - 0850</b>	Computational screening of zeolites for the adsorption of selected Pharmaceutical pollutants: - <i>Fred Sifuna Wanyonyi</i>
<b>0850 - 0910</b>	Microbial levels in drinking water, and prevalence of waterborne diseases in Marigat urban centre Baringo county, Kenya: - <i>George Morara</i>
<b>0910 - 0930</b>	The role of Phytochemicals in prevention and control of chronic diseases: - <i>Monica Kibe</i>
<b>0930 - 0950</b>	Pollution levels of cancerous Polycyclic aromatic hydrocarbons in water from Lake Victoria Kenya: - <i>Okongo Dismas</i>
<b>0950 - 1010</b>	Anthropogenic pressure and its effect on the behavior and dispersal patterns of the greater kudu ( <i>Tragelaphus Strepsiceros</i> ). Within the lake Bogoria landscape, Kenya: - <i>Rhoda Nyasu</i>
<b>1010 - 1030</b>	Public policy implementation challenges; An assessment of environmental management and coordination act, 2017 (CAP 387) in Bomet East Sub-County- Kenya: - <i>Geofrey Towett</i>
<b>1030 – 1100</b>	<b>HEALTH BREAK</b>
<b>1100 – 1330</b>	<b>CLOSING CEREMONY</b>
<b>1330 - 1430</b>	<b>LUNCH BREAK</b>
<b>1430 -</b>	<b>DEPARTURE</b>

**CIRIS 2021 INTERNATIONAL CONFERENCE** *Parallel sessions Schedule*

<b>DAY TWO: Thursday, 3<sup>rd</sup> June, 2021.</b>	
<b>PARALLEL SESSION I (E)</b>	
<b>Sub-Theme:</b> Business economics, human resources, leadership and governance	
<b>Venue:</b> HN 8	
<b>Chair:</b> Dr. Francis Omollo	
<b>Rapporteur:</b> Joel Kiplimo Too	
<b>TIME</b>	<b>TITLE</b>
<b>0830 – 0850</b>	Effect of risk taking and the sustainability of small and medium enterprises performance in Uasin Gishu county, Kenya: - <i>Belinda Chelagat</i>
<b>0850 – 0910</b>	Influence of Information Communication Technology (ICT) on management of businesses in Ainamoi Sub-County: - <i>Cosmas Langat</i>
<b>0910 – 0930</b>	Influence of employee assistance programs on commitment of nurses in public hospitals in Kenya: - <i>Denis Okerosi Okemwa, Dr. Wallace Nyakundi Atambo, and Prof. Willy Muturi</i>
<b>0930 – 0950</b>	Effectiveness of knowledge management in enhancing performance in Eldoret Polytechnic, Kenya: - <i>Joan Wafula</i>
<b>0950 – 1010</b>	Bargaining power of suppliers influence on competitive advantage of micro and small food industries in Kenya: - <i>Francis Okumu Omillo</i>
<b>1010 - 1030</b>	Effect of value chain design on performance of improved indigenous/Kienyenji chicken's in Kirinyaga County: - <i>Rachel Mugure Mburu</i>
<b>1030 – 1100</b>	<b>HEALTH BREAK</b>
<b>1000 – 1330</b>	<b>CLOSING CEREMONY</b>
<b>1330 - 1430</b>	<b>LUNCH BREAK</b>
<b>1430 -</b>	<b>DEPARTURE</b>

CIRIS 2021 INTERNATIONAL CONFERENCE *Parallel sessions Schedule*

DAY TWO: Thursday, 3 <sup>rd</sup> June, 2021.	
PARALLEL SESSION I (F)	
<b>Sub-Theme:</b> Hospitality and Nutrition	
<b>Venue:</b> HN 9	
<b>Chair:</b> Dr. Faith Yego	
<b>Rapporteur:</b> Naom Bett	
TIME	TITLE
0830 – 0850	Influence of Millennial employees abilities on their work performance in selected hotels, Eldoret Town, Kenya: - <i>Nancy Sei, Jane Kiprono, and Raphael Murei</i>
0850 – 0910	Contemporary innovations in food waste management in commercial foodservice outlets in Kenya: - <i>Albert Daniel Odula and Leah Wawuda Waseni</i>
0910 – 0930	Use of Amaranth flour in pasta fortification: - <i>Chepkwony Peter and Onsando Gertrude</i>
0930 - 0950	Environmental sustainability in the hospitality industry: - <i>Kelvin Otieno</i>
0950 - 1010	Food security in West Pokot County, Kenya: The traditional coping strategies towards food shortage in the semi-arid area: - <i>Nyanumba Shem Asuga</i>
1010 - 1030	Watermelon rinds jam: - <i>Chepkwony Peter, Yegon Sharon</i>
1030 – 1100	<b>HEALTH BREAK</b>
1100 -1330	<b>CLOSING CEREMONY</b>
1330 - 1430	<b>LUNCH BREAK</b>
1430 -	<b>DEPARTURE</b>

**AGRICULTURAL SCIENCES**  
**FOR**  
**FOOD SECURITY**  
**AND**  
**SUSTAINABLE DEVELOPMENT**

## Strategies of reducing postharvest losses during storage of grain crops to strengthen food security in Kenya

Joel Atsali Amunga\*

\*Corresponding author email:

### Abstract

While fulfilling the food demand of an increasing population remains a major global concern, more than one-third of food is lost or wasted in postharvest operation reducing the postharvest losses, especially in developing countries, could be a sustainable solution to increase food availability, reduce pressure on natural resources eliminate hunger and improve farmers livelihood. Cereal grains are the basis of staple foods in most of the developing nations, and account for the maximum harvest losses on a calorific basis among all agricultural commodities. The main objectives of this study are to, firstly to increase food security and food safety situations in Kenya, security to reduce post-harvest losses in maize value chain in Kenya and lastly to find ways of reducing post-harvest losses to farmers. Questionnaire methods of data collection was used to assess local farmers knowledge, attitude and practices on postharvest maize storage and management with a view of understanding its role in maize contamination with mycotoxins and postharvest losses in Rift valley and western regions of Kenya among 80 and 100 farmer, respectively. Differences between the two regions were analyzed using in chi-square test, fisher exact test, and two-sample t-test. The median quantity of maize harvested by farmers in the two regions after shelling was 450kg. The quantity of discolored and mouldy maize consumed ranged from 0 to 90kg, 3% respondents consumed mouldy maize, 15% fed it to cows and 25% fed it to poultry. A small percentage 5% believed mouldy maize is safe for human consumption, while 20% considered it safe for brewing. Nearly half of the respondents 49% kept maize in class indoors, 45% left in the field without covering, 30% consumed and sold maize while still green, with more farmers from western practicing this. The results of the study suggest that there were poor postharvest practices and low awareness level among maize farmers and that this can lead to postharvest losses due to fusarium SPP infection, weevils and mycotoxin contamination that poses a threat to human and animal food safety. This calls for intervention on better postharvest practices.



**Role of institutional capacity and technological practices in implementation of food security projects in Hamisi Sub-County, Vihiga County, Kenya**

**Obushe Dennis Omuse<sup>1\*</sup>, Asige Mmaiti Lawrence<sup>1</sup>**

**<sup>1</sup>Department of Social Studies, Maasai Mara University**

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**Abstract**

This paper sought to analyze the role of organizational capacity and technological practices in implementation food security projects in Hamisi Sub-County, Vihiga County, Kenya. Specific objectives were to establish the extent to which institutional capacity and technological practices influence implementation of food security projects in Hamisi Sub-County. A descriptive survey design was adopted for the study. The study was conducted in all the 24 producer groups in the sub-County. Questionnaires and interview guides were used as main data collection instruments. Both descriptive and inferential statistics were used in the analysis process. The results showed that institutional capacity and technological practices influenced the successful implementation of the projects in the sub-County to a great extent. It was further noted that institutional capacity has a very strong significant correlation with successful implementation of food security initiatives in the sub-County. In regard to technological practices, it was further established that they had a very strong significant correlation with the successful implementation of food security initiatives. The results show that most of the efforts were failing due to poor institutional capacity factors and also low application of targeted technological applications aimed at driving these projects to success. It is therefore recommended that success in food security initiatives depend on institutional capacity and application of effective technological practices. Key stakeholders should endeavor to strengthen the above factors for effective implementation of these initiatives in the study area.

**Key words**

Food Security, Institutional capacity, Sustainable Development Goals, Technological practices

## **Effect of Hydrocolloid Gum on the Pasting Properties of Corn and Cassava Starches**

**Virate Kiprof<sup>1\*</sup>**

<sup>1</sup>The Eldoret National Polytechnic

\*Corresponding author email:

### **Abstract**

Starch has a wide variety of applications and its properties during processing are major determinants of starch employment for food development. The pasting properties of starch are influenced by the starch-gum interaction. In this study, the effect of gum Arabic at concentrations of (0 %, 0.5%, 2.0%, 4.0%, 6.0% and 8.0 %) on the pasting properties of corn and cassava starches were investigated. Blends were prepared by substituting the starches with gum, whereas native corn and cassava starches were used as control. The pasting properties of the starch-gum mixed systems were determined using the Brabender viscograph. The results showed that gum Arabic decreased significantly the most important pasting parameters (peak viscosity, final viscosity, break down and setback values) of starches. However, there was no significant effect of gum Arabic on the pasting temperature (71.8 °C - 72.1 °C) for corn starch and (68.7 °C - 68.9 °C) for cassava starch. Overall, gum Arabic affected the pasting properties of the corn and cassava starches hence could play a major role in determining starch end use functionality.

### **Key words**

Starch, gum Arabic, pasting, processing

## **Analysis of the structure, conduct and performance of Irish potatoes marketing in Kisii central sub-county, Kisii County, Kenya**

**Ondieki Cynthia Kerubo<sup>1\*</sup>, Geoffrey Amusala<sup>1</sup>**

<sup>1</sup>Department of Agricultural Economics and Resource Management, School of Agriculture and Natural Resources, Moi University

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### **Abstract**

The structure, conduct and performance of Irish potato are one of the important aspects to be considered in any economy. This study aimed at collecting data concerning the structure, conduct and performance in Kisii Central Sub County with aim of attaining the following objective: to establish the competition in terms of seller concentration in Kisii Central Sub County; to assess the performance of Irish potato marketing in Kisii Central Sub County and to

determine the degree of integration between the Irish potato markets in Kisii Central Sub County. The study aimed at answering the question that Irish potato marketing in Kisii Central Sub County is not that competitive in the region with Irish potato marketing not efficient and that there is no integration between Irish potato markets within the region. The population consisted of 45 traders who comprised of retailers and wholesalers that were selected from the three main markets in the sub-county to ensure an unbiased representative sample. Stratified sampling was used to select the locations of study using administrative boundaries. The markets were selected using purposive sampling technique, that is, only Irish potato markets selected. Then, systematic sampling was used to select the traders. Retailers were identified according to the volume of Irish potatoes they handle per day. The type of data collection that was used was from both from primary sources and secondary sources with the use of questionnaires and interviews and market survey technique was the research design that was used. Data was analyzed and sample described using descriptive statistics (frequency and percentages) and presented using frequency tables. It was established that most of the Irish potato vendors do enhance their competition in terms of seller concentration. Based on the findings of this study, it can be concluded that there is competition among Irish potato marketing in terms of seller concentration to be high. Based on the findings of this study, the following recommendations are made: the management of the markets in Kisii Central Sub County should enhance competition among Irish potato vendors to boost seller concentration across all the vendors.

**Key words**

Structure, Conduct, Performance of Irish Potatoes, Marketing

**Influence of post-harvest technology on food security in Narok East Sub-County, Narok County, Kenya**

**Asige Mmaiti Lawrence<sup>1\*</sup>, Obushe Dennis Omuse<sup>1</sup>**

<sup>1</sup>Department of Social Studies, Maasai Mara University, Narok County, Kenya

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**Abstract**

Crop yields have decreased in many areas due to declining investments in research and infrastructure as well as increasing water scarcity which are preconditions for global food security. By the year 2016, an estimated 120,000 people in rural areas and 30,000 in urban centers of Narok County were food insecure. This has attributed to a mismatch in food availability, access and utilization. The purpose of this study was to establish Influence of Post-Harvest

Handling on Food Security in Narok East sub-County, Narok County, Kenya which like other counties in the ASAL areas experience cases of food insecurity. The specific objective of the study sought to establish the influence of post-harvest handling on food security in Narok East sub-County, Kenya. The study adopted human capability approach. A descriptive research design was adopted by the study. The target population comprised of 25078 households distributed proportionally in the 4 wards and are involved in different farming activities. A sample of 378 household heads was determined using the sample size determination formula by Krejcie and Morgan (1970) from the target population. Furthermore, 1 sub-county crop officer and 4 ward extension officers was used in the study and hence it was a census. The total number of respondents for the study was 383. Primary data was collected using a questionnaire and an interview guide. Data analysis was done using descriptive statistics of frequencies, percentages and inferential statistics of correlation, ANOVA and regression analysis. Statistical Package for Social Sciences software version 26 and the Excel software was used as a data analysis tools for the study. The results was presented using frequency and percentages, tables and charts. The relationship between the variables was tested at a significant level of 0.05. The results show that there is a strongly positive and significant correlation between post-harvest technology and food security in the sub-county ( $r = .606^{**}$  and  $p\text{-value} = 0.000$ ). This implies that the relationship between the variables is very significant hence post-harvest technology is as strong determinant of food security in the study area. The study concludes that the null hypothesis that there is no relationship between post-harvest technology and food security was rejected because the ANOVA model indicated a very significant and statistical relationship between the two variables. The study will be beneficial to the farmers in the ASAL areas who have consistently experienced food insecurity. The study will also benefit the National Government, County Governments and other Non Governmental Organizations in the area of food security as it will provide appropriate data that was used for policy making.

#### **Key words**

Arid and Semi-Arid areas, Food security, Post-Harvest Technology, Narok East sub-County,

### **Rangeland rehabilitation and enhancement of livelihoods using adaptable grass ecotypes in Baringo South, Baringo County**

**Kasitet S. <sup>2\*</sup>, Ogendi G. M. <sup>1,2</sup>**

<sup>1</sup>Department of Environmental Science, Egerton University, <sup>2</sup>Dryland Research Training & Ecotourism Centre, Chemeron, Box 536 Egerton

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**Abstract**

Rangeland degradation is a serious environmental challenge in the arid and semi-arid environments in Africa. It is driven by unsustainable land use practices, adverse climatic conditions and population increase. Whereas they are recognized as an important livelihood stream to its inhabitants across the globe through a range of products and ecosystem services, their degradation is a major concern for various stakeholders. Rangeland degradation has led to decline in provision of ecosystem services and food insecurity. Grass reseeding technology, using indigenous perennial grass species has been touted as a solution for restoring ecosystem functionality in these degraded lands as well as enhancement of livelihoods through commercialization of pasture and value added products. This study assessed the utilization of two grass ecotypes: *Cenchrus ciliaris* and *Eragrostis superba* for rehabilitation and restoration of degraded rangelands within South Baringo. The study adopted a cross-sectional household survey design in data collection that targeted a population of 500 households and 5 key informants within Baringo South. Simple random sampling was used to select household respondents. Questionnaires and interviews were used to collect data. The results indicate that 70% of the people in the area used *Cenchrus ciliaris* grass ecotype for rangeland rehabilitation. Further the results indicated that *Cenchrus ciliaris* and *Eragrostis superba* were the preferred grass species by the pastoralists and fodder producers due to their ability to easily establish, drought tolerance and their viability and ease in harvesting seeds. Seventy two percent (72%) of the farmers interviewed practice grass reseeding as a means of rehabilitating their degraded individual farms. *Cenchrus ciliaris* and *Eragrostis superba* were the most preferred species, primarily due to its role in improving livestock productivity and environmental conservation. Other uses of the grasses include; sale of hay and grass seed as a source of income, thatching of houses and granaries and range land rehabilitation. The results further demonstrated as to the ability of these two grass ecotypes in rehabilitating degraded lands. We therefore recommend the adoption of the two grass species in rehabilitation of degraded lands especially within the arid and semi-arid lands of Kenya. We further recommend that agro pastoralists be supported by county and national government agencies financially and technology transfer.

**Key words**

Rangelands Rehabilitation, Land Degradation, Food Security, Reseeding

## **Design and fabrication of combined maize thresher and cob gridding machine**

**John Chomba<sup>1\*</sup>**

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### **Abstract**

Assessing the performance characteristics and the development of maize threshing machine and cob gridding is the focus of this paper. Maize threshing machine and cob gridding was fabricated based on engineering design approach with the aid of software (CAD) and values, and was later fabricated at Nyeri National Polytechnic Workshop using suitable materials after considering the material properties such as Hardness, ease of machining, tensile strength, availability, durability and the cost. The machine is electrically operated by an electric motor with power rating of 2.235 kW, speed of 2800 rpm and torque of 14.92 Nm. Kernel losses and damages were found to be very negligible. It threshes 75 times as fast as hand threshing. The design presented in this paper is aided with computer software (AutoCAD) to give the accurate and precise results. Maize shelling machine and cob gridding was developed to separate the cob from the grains and grid the maize cobs with appropriate engineering design factors. The efficiency of the machine is a benchmarked against the commercially available maize shelling machines. It has an average threshing capacity of 200 kg/hr, its shelling efficiency is 94.29 % and breakage is very insignificant, as well as losses. The machine can help to substantially reduce the human labour and stress involved in shelling maize and also reducing the time used for shelling and gridding operation on farms. There is no doubt that the machine will ease the long term problem of maize shelling and cob gridding for animal feed production especially for the rural farmers.

### **Key words**

Material properties, Power rating, Cob-gridding, Shelling, Animal feed

## **Analysing the effects of agricultural technologies on agriculture and food security**

**Iren Kidali<sup>1\*</sup>**

<sup>1</sup>Mawego Technical Training Institute

\*Corresponding author email:

### **Abstract**

Agriculture has predominantly remained to be an important contributor in the global food security and national revenues at large. In Kenya it contributes to 54% of the country's GDP. Agricultural sector has witnessed several changes over the past years due to advancement in the different farming methods, storage, and other allied farming techniques. Today, there is the use of technological inputs like inorganic fertilizer, reduced consumption of pesticides in the farm produce, the use of tractors and machinery in the field. The availability of agricultural allied NGOs like one acre fund has seen tremendously added the production of food, because of new technologies incorporated in their approaches of farming. Presently, farmers can grow crops in such areas which were initially considered unfavorable for such crops. This is only possible through agricultural biotechnology. All these have solved the problems which farmers used to have in the past like the need to satisfy labor. The increasing cost of labor need be compensated, which calls for reducing the cost of labor, simplifying the process of farming, introduction of and combined harvester. My paper comes with the finding that when the usage of technology in agriculture increases, the productivity and food security of the produce also increase. Further, the paper reflects that although some farmers are still hesitant to use modern agricultural technology, they can still be informed to adopt. My paper also brings the time comparisons of the time when farmers discouraged the use of technology in farming and when its magnificently adopted.

## **Assessment of socio-economic viability of Improved *Kienyeji* Chicken production using sorghum-based rations in Semi-Arid regions of western Kenya**

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### Abstract

Smallholder farmers in semi-arid regions of Western Kenya, keeping indigenous (*Kienyeji*) chicken face the challenge of low productivity due to poor management, inadequate nutrition, unproductive breeds and high disease prevalence. Rearing of improved indigenous chicken using low cost, locally available feed rations under improved management practices can help address the low chicken productivity and the region's food insecurity. Through a field survey in Siaya and Busia Counties, socio-economic viability of Improved *Kienyeji* Chicken (IKC) production using sorghum-based diets was assessed. Sorghum is generally not a highly commercialized crop, grown more as a cultural food crop and therefore limiting its incentives for increased production. Its use as a locally available, low cost, grain energy source in feeding IKC is however a possibility that can be adopted by local sorghum growing farmers to improve chicken productivity. The survey was done using a sample of 50 poultry keeping/sorghum growing households from 5 different wards. Each farmer was given eight-4 week old IKC growers, trained on best management practices and monitored for 16 weeks to assess chicken performance using fortnight evaluations and a questionnaire. Data collected included chicken breed preference and management practices, preferred rearing systems and feeding regimes and growth trends, available feed resources, their cost and inclusion levels in rations, chicken marketing and flock replacement strategies, egg and chicken consumption and chicken survival rates. Most (94%) farmers highly preferred IKC because of fast growth, docility and low investment cost; 6% preferred other types of chicken. Most (69.4%) farmers use sorghum variety *Nyadundo* as chicken feed, together with maize, soybeans and fishmeal (*omena*) and/or *omena* dust (*ochon'ga*), because they are available (78%) on the farm and quite often (67%) on the market. *Nyadundo* is highly available. Most (79%) birds survived during the 4 months of the study period. Most farmers (65%) keep chicken under free range. Most (75%) birds fed on homemade rations where protein source was over 25% gained weight of 1.5kg and above. The chicken weight gains were fairly comparable to those of maize based commercial feeds used in an earlier feed trial experiment. Most farmers (67%) who mixed maize to sorghum at 1:1 ratio incurred a marginally higher (KSh65.2 vs 61.2 and 57.20) cost compared to those (33%) who mixed the two at a ratio of 1:2 or 0:1. Most farmers (84%) market their birds as the need arises without planning for the market. Egg consumption as a source of high value protein is done on a weekly basis by 80% of the farmers; 79% of birds were still surviving after 12 weeks. Adoption of IKC production using sorghum based feeds is viable and can help diversify chicken feed and broaden household diets to reduce malnutrition, hidden hunger, and food insecurity and alleviate poverty in the semi arid regions of Western Kenya.

### Key words



Food security, Homemade rations, Improved *Kienyeji* chicken, Socio-economic viability, Sorghum-based low tannin diets

**Contributions of Climate Smart Agricultural Strategies on Adaptation to Climate Change among Smallholder farmers in Nyaribari Chache Sub-County, Kisii County**

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**Abstract**

Smallholder farmers are usually susceptible to the effects of climate variations. Most of these farmers, their agricultural activities are greatly rainfall dependent and compounded by their acute poverty, poor infrastructural and technological advancement. This study sought to assess the contributions of Climate Smart Agricultural strategies on adaptation to climate change among small holder farmers in Nyaribari Chache Sub-County, Kisii County. A household survey was conducted for collection of primary data. Ten administrative sub-locations were randomly sampled for the study. Twenty households were randomly sampled from each sub-location to make a sample size of 200 households. Questionnaires were used for primary data collection. Questionnaires contained both open-ended and close-ended items. Questionnaires were administered to 200 households to collect data on contributions of Climate Smart Agricultural strategies to adapt to climate change among small holder farmers in Nyaribari Chache Sub-County, Kisii County. Both descriptive and inferential analysis were used to analyze data collected. Study findings indicated that crop diversification, use of different crop cultivars, crop rotation and mixed cropping were the primary adaptation approaches employed in the study area. Availability to credit facilities, farm revenue and climate variation discernment including household size had a significant positive impact on embracing of CSA strategies ( $p < 0.005$ ). Small fields, inadequate extension facilities, low education levels, scanty weather and climate statistics were main hurdles impacting on implementation of CSA strategies. Therefore, in order to check the susceptibility of smallholder farmers to effects of weather or climate erraticism and variation, stakeholders should heighten exposure of farmers to extension services and prompt distribution of climate variations data for informed decision making.

**Key words**

Mixed cropping, Crop rotation, Extension, Credit, Kisii

## Unmasking the relevance of technical, vocational education and training (TVET) in Kenya

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### Abstract

Kenya has in recent years given priority to TVET as an avenue as reflected by huge budgetary allocation and various reforms in the sector aimed at making it responsive to production of relevant manpower in view of demands of her various sectors of the economy. This study endeavored to establish the relevance of TVET training in view of the demands of Sustainable Development. This study aimed at unravelling the relevance in Kenya's TVET system by; evaluating Courses offered at TVET institutions; level enrolment in various Courses; performance of Trainees in national examination and the relevance of industrial linkage of TVET trainees. The study was undertaken in 10 Public TVET institutions in Western Kenya. Data was collected using questionnaire, interview schedule guide and document analysis. Principals, Heads of Departments and Human resource managers of two major companies were respondents. The study established that though various courses were offered at different TVET institutions, enrolment in Science and performance in Science courses stood at was less than 30 and 20 percent respectively. This situation was worse on evaluation on basis of gender where female trainees were less than 10 percent in most Science oriented courses, courses. However, enrollment was highest in business oriented course with enrollment standing at least 55 percent for Business oriented courses in most institutions. The study further established Trainees were exposed to a 3 Month practicum program which was considered inadequate. With poor enrollment and examination attainment in Science oriented Courses coupled with low industrial linkage, TVET is unlikely to promote attainment of desired Country's social economic development. The study calls for urgent attention in addressing the issue of enrollment in Science oriented Courses, performance of trainees in the examination and industrial linkage as a way of enhancing relevance of TVET.

### Key words

Relevance, TVET, Practicum, Unmasking

**BUSINESS, ECONOMICS,  
HUMAN RESOURCE,  
LEADERSHIP,  
AND  
GOVERNANCE**

## Effect of investment policy on the financial performance of savings and credit cooperatives societies in the banking sector in Kenya

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### Abstract

Kenya has a long history of co-operative development that has been characterized by strong growth. Co-operatives are recognized by the government to be a major contributor to national growth and development and they account for over thirty percent of the National Domestic Saving in Kenya. One of the major strategy for enhancing the growth of cooperative societies is having an investment policy in place. However, the policy may work for or hinder the cooperatives from optimizing their mandate. This study sought to establish the effects of investment policy on the financial performance of Savings and Credit Co-operatives (SACCOs) in the banking sector in Kenya. This study adopted a descriptive survey design. The target population was Co-operatives in the banking sector in Kenya. Stratified sampling and simple random sampling was used to obtain the sample items. A Likert scale questionnaire was used to gather primary information and a secondary data collection sheet was used in gathering secondary information regarding Co-operatives performance. Information was sorted, coded and input into the statistical package for social sciences (SPSS) version 21.0 for production of graphs, tables, descriptive statistics and inferential statistics. The study revealed that the SACCOs investment policies ensured that surplus funds were invested in income generating avenues such as giving loans to members as a matter of priority. Any other investments must be approved by members during the annual general meeting preferably investment in Government bonds due to their good returns and reliability. In addition members are encouraged to plough back their dividends as capital. The results indicated that there was a positive relationship between invest policy and the financial performance of SACCOs in the banking sector in Kenya with a correlation coefficient ( $r$ ) of 0.679, coefficient of determination ( $r^2$ ) of 0.461 and with a  $t$ - value of 0.000. The study concluded that investment policy is statistically significant in explaining the financial performance of SACCOs in the banking sector in Kenya. The study recommends that SACCOs should have sound investment policies to improve their financial performance and sustainability to further stir up economic growth.

### Key words

Banking sector, savings and credit co-operatives, internal politics, financial performance, sustainable development

**Financial rewards and employee's performance in impact sourcing companies in Kenya:  
Case of cloudfactory Kenya limited**

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**Abstract**

The global platform today has become dynamic and challenging with ever increasing demands on the organizations, and thus organizations must embrace reward management strategies that enhance competitiveness, profitability and employee performance. Human capital can give an institution unrivalled competitive advantage in the face of stiff competition. The study investigated the effect of financial reward management strategies on employee performance in Cloud Factory Kenya Limited. Descriptive research design was used for this study. The target population was 45 permanent staff. Primary data was collected using a self-administered google questionnaire. SPSS was utilized to process data. Data was analyzed using descriptive statistics, Pearson's correlation, regression analysis and analysis of variance. Financial reward was found to have a strong positive relationship with employee performance at  $r=0.603$  with a  $p=0.000$  which was significant at 0.01 significance level. The study recommended that there should a continuous review of financial rewards in order to maximize employee performance.

**Key words**

Financial rewards, employee performance, Kenya

**Determinant of women participation in community development projects in Kakamega County**

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**Abstract**

Women continue to be marginalized and pushed out of major development decision as if they are lesser important human beings. Efforts to increase women participation by government through creation of Women representative positions and most recently the proposed constitutional change through 2021 Amendment Bill popularly known as BBI in Kenya has not had any effect in improving the involvement of women in community development projects. This effort has only escalated criticism from stakeholders who view it as an avenue that has been used by corrupt cartels to reward their wives, blood

relatives and their tribal cocoons. More alarming, is the fact that vices such as sexual abuse, domestic violence and genital mutilation are deeply rooted in majority of our Kenyan community's culture. Experts and researchers have also clashed and given different opinion on what exactly determines women participation in community development projects. Therefore, this study will assess the determinants of women participation. Specifically, it will analyze Education and training and its influence on women participation in community development projects with emphasis on their participation behavior. The study targets 100 women. Purposive sampling techniques will be used due to the unique and dynamic nature of women with a sample size of 40. Research design used is explanatory research design due to the cause effect nature of Training and Education on Women participation. Questionnaires will be used. Validity of instruments will be tested by discussing them with specialists while reliability will be tested using cronbach alpha so as to find the consistency of data. Pilot testing will be done to determine reliability of research instruments. Data will be analyzed by use of SPSS and presented by tables for easier communication. This study will contribute to the existing debate, harmonize the conflicting findings by scholars and reveal in a nut shell what exactly influences women participation behavior. This will boost efforts by government in addressing inequality and inclusivity.

**Key words**

Training and Education, Women Participation

**Influence of Information Communication Technology (ICT) on management of businesses in Ainamoi Sub-County**

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**Abstract**

This research project aimed at investigating the Influence of Information Communication Technology (ICT) on management of businesses in Ainamoi sub-county. The objective of the study was to determine the influence of internet use by businesses in Ainamoi Sub-County. This study adopted a descriptive survey design. Khan, (1993) recommends descriptive survey design for its ability to produce statistical information about aspects of education that interests policy makers and researchers. The target population in Ainamoi Sub-County was 1936 entrepreneurs. A sample of 332 entrepreneurs was selected using a stratified sampling whereby the Ainamoi Sub-County was subdivided geographically into 4 different centers (strata) and specific number of entrepreneurs selected randomly from each stratum (center). Two hundred entrepreneurs were selected from Kericho town, 82 from Nyagacho, 25 from

Brooke and 25 from Ainamoi Market. The data was collected from the sample by way of questionnaires. The findings were therefore compiled and computations done where applicable. These were used to draw conclusion on the research and recommendations made so that if possible, the business managers may act accordingly. The results brought out a true picture of how Information Communication Technology has been employed and its influence on business management. The findings revealed that many Entrepreneurs have not adopted ICT devices except mobile phone whose adoption is 100%. Many of the respondents use traditional methods like books in keeping records, newspapers and posters in advertising, calculators and manual system in calculations, and cash system of payment for transactions. As they mostly used traditional methods in the management of their enterprises, they are facing a lot of challenges in the management of their businesses. Business owners have been advised to adopt the use of ICT in their businesses to improve performance in management and to increase profitability.

### **Influence of employee assistance programs on commitment of nurses in public hospitals in Kenya**

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#### **Abstract**

The aim of this study was to investigate the influence of employee assistance programs on commitment of nurses in public hospitals in Kenya. The researcher utilized proportionate simple random sampling to select 364 nurses. A cross sectional research design was used. Semi-structured questionnaires were used to collect data. Data were analyzed using descriptive, correlation and regression analysis. The findings showed a weak significant positive correlation between adequacy of employee assistance programs and level of commitment of the nurses as indicated by a Pearson's correlation coefficient of 0.394 significant at 5% level of significance. Secondly, the regression model on the influence of employee assistance programs on commitment of nurses;  $\text{commitment} = 26.304 + 0.620(\text{adequacy of Employee Assistance Programs})$ , indicating that there is a positive linear relationship between employee assistance and commitment. In addition, a coefficient of determination  $R = 0.155$  was obtained, indicating that 15.5% of the variation in the level of commitment for the sample of 309 nurses in public hospitals can be explained by the variations in the adequacy of employee assistance programs. Based on these findings, the researcher concludes that adequacy of employee assistance programs significantly influence levels of commitment of nurses in public

hospitals in Kenya. Given that employee assistance programs in public hospitals is inadequate the study recommends that public hospital management team should enhance employee assistance programs in terms of adequacy in order to improve on the levels of commitment of nurses.

**Key words**

Employee Assistance programs, Commitment, Public hospitals, Nurses, Work-life balance.

**Effectiveness of knowledge management in enhancing performance in Eldoret polytechnic, Kenya**

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**Abstract**

In many organizations knowledge management has not been effective, lots of data and information lies buried in magnetic tapes and films in libraries and guarded data vaults. If these data could be retrieved, analyzed and documented, it could steer such organizations to new, unexplored, and almost unassailable competitive positions in their respective fields. The challenge is how to get all these vast amounts of data and information analyzed meaningfully to the advantage of the concerned organizations. This paper reports the findings of a study conducted at The Eldoret National Polytechnic between July 2018 and February 2019. The aim of the study was to investigate the effectiveness of knowledge management in enhancing performance at the Eldoret Polytechnic and propose strategies for improvement. The study was informed by the Knowledge management Success Model and the evolutionary theory. The study adopted case study research design and used a qualitative research method with some aspects of quantitative techniques. A sample size of 47 staff and 210 students was selected. Purposive sampling was employed to select staff respondents and simple random sampling technique was used to select student respondents. Data was collected using personal interviews, observation schedules, questionnaires and documentary reviews. Qualitative data was analyzed thematically while quantitative data was analyzed using tables and percentages. The findings of the study revealed that: explicit, tacit, experimental and embedded knowledge are generated. The study concludes that knowledge management is not very effective due to various factors which include lack of proper knowledge management guidelines to govern knowledge management activities. The study recommends: appointment of knowledge management officer to implement knowledge management system and



functions and putting in place of a knowledge management policy and program.

**Key words**

Knowledge, knowledge management, tacit, explicit

**Social rewards and employee's performance in impact sourcing companies in Kenya: Case of cloudfactory Kenya limited**

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**Abstract**

The study explored on the effect of social rewards on employee performance in CloudFactory Kenya Limited. Descriptive research design was used for this study. The target population was 45 permanent staff. Primary data was collected using self-administered google questionnaires. SPSS was utilized to process data. Data was analyzed using descriptive statistics, Pearson's correlation, regression analysis and analysis of variance. Social rewards had a strong positive relationship with employee performance at Cloud Factory Kenya Limited at  $r=0.492$  with a  $p=0.002$  which was significant at 0.01 significance level. The study recommended that there should continuous improvement social rewards in order to maximize employee performance.

**Key words**

Financial rewards, employee performance, Kenya

**Bargaining power of suppliers influence on competitive advantage of Micro and Small Food industries in Kenya**

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**Abstract**

The study measured the extent to which of suppliers' switching costs, union and forward integration influenced competitive advantage of micro and small food manufacturing firms in Kenya. Porter's five force theory and the Law of supply informed the study. The study used mixed methods and explanatory design research in collecting and measuring the views of 132 light industries manufacturing food in Busia and Nairobi. The study found out that suppliers' switching cost ( $T$  test (3) = -0.39,  $p=0.697$ ,  $sig>0.05$ , 2-tailed), unions ( $T$  test

(3) = 0.292,  $p = 0.771$ ,  $sig > 0.05$ , 2-tailed) and forward integration ( $T$  test (3) = -0.132,  $p = 0.895$ ,  $sig. > 0.05$ , 2-tailed) did not significantly influence competitive advantage of light industries in Kenya. This meant that suppliers bargaining power and consequently the prices of their produce were low. Farmers' (who are the suppliers) were desperate; they had no control of prices of their products at the market. Farmers should, therefore, form entrepreneurial marketing associations that would scan for new markets and bargain favourable prices for their products. Secondly, the farmers should be helped by the government and other development agencies to forward integrate in the value chain by putting up processing firms to refine their raw products. It also meant that cost of raw material was low; an opportunity to establish and expand more light industries for food in Busia and Nairobi. Because the study suggested that here were other critical factors beyond switching costs, unions and forward integration that shook the food industry, further studies could be done on other determinants of suppliers' bargaining power such as suppliers' intensity, uniqueness of service and location in small and large food industries.

**Key words**

Bargaining power of suppliers; advantageous foods; micro and small food industries

**Effect of value chain design on performance of improved indigenous/Kienyenji chicken's in Kirinyaga County**

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**Abstract**

Access to agricultural inputs would aid in the achievement of desired output among improved chicken farmers. Thus, the paper investigated the effect of value chain design on the performance of improved indigenous (kienyenji) in Kirinyaga County. Descriptive research design was applied and primary data gathered among 103 respondents. Data was analyzed using descriptive and inferential statistics. Study findings indicate that production of improved kienyenji chicken in Kirinyaga County was positively affected by inbound logistics, operating activities, outbound logistics and support activities. It was concluded that there is need for provision of requisite inputs that would optimize performance of improved indigenous chicken in Kirinyaga County.

## Effect of Risk Taking and the Sustainability of Small and Medium Enterprises Performance in Uasin Gishu County, Kenya

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### Abstract

Currently, the SMEs sector in Kenya contributes over 70% of the country's GDP. This is in spite of the many issues surrounding this vital sector including low performance as compared to non-family enterprises, high mortality rate especially after the founder exits. The study sought to establish the effect of risk taking and the sustainability of small and medium enterprises performance in Uasin Gishu County, Kenya. Psychological / Trait Entrepreneurship theory was. The study adopted descriptive survey research design. The study population was 700 registered enterprises in Uasin Gishu City County. Simple random sampling was used to select 201 SMFEs. Primary data was collected using questionnaires. The quantitative data was analyzed using descriptive statistics using Statistical Package for Social Sciences (SPSS) Version 26. Inferential data analysis was carried out to determine the relationship between the dependent variable and the independent variables. Regression model was fitted and hypothesis test carried using linear regression analysis. There was a positive and significant relationship between risk taking and risk taking and the sustainability of small and medium enterprises performance. This implied that there was a positive and significant relationship between risk taking and the sustainability of small and medium enterprises performance. Although, risk taking enhances manufacturing company's performance, there is need to have an elaborate risk management procedure. The SMEs management should be preparing a risk register detailing the previous risk and how they were mitigated and future opportunities which can be explored by manufacturing companies.

### Key words

Risk Taking, Sustainability, Small and Medium Enterprises, Performance

### **Influence of Access to Resources on Sustainable Financial Performance of Small and medium enterprises in Uasin Gishu County**

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#### **Abstract**

The SMEs play critical role in creating job opportunities and growth of the economy. Currently, the rate at which the new firms formed have stagnated and those with less than 5 years are closing down is very high. This study investigated the effect of access to finance on sustainable financial performance of processing SMEs in Uasin Gishu County. this study adopted Pecking Order Theory (POT). Descriptive research design was applied to conduct the study. The target population was the 250 SMEs in Uasin Gishu County where for each firm were considered as respondents giving rise to a total of 75 respondents. A questionnaire was used to collect primary data from the respondents. Both descriptive and inferential statistics were used in this study. Collected data was cleaned and coded to measure completeness of the information obtained. Statistical program for Social Sciences (SPSS V26) was used to statistically analyse the data. The regressions results revealed a positive influence of access to finance on the sustainable financial performance of SMEs. The findings of the study indicated that sustainable financial performance positively correlated with the access to finance. The study recommended financial institutions to create favourable policies to enable SMEs access loans easily. The study recommended government to offer incentives and funding to SMEs at a lower cost to boost their financial performance.

#### **Key words**

Access, resource, sustainable, Financial, Performance, SMEs

### **Effect of Working Conditions on Sustainability of Service Delivery in Devolved Health Services in Kericho County**

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#### **Abstract**

Health is vital for the survival of any human beings. Hospitals are increasingly looking for ways to improve efficiency and reduce overall costs that will help

them thrive now and in the future. Hospitals pursue sustainability efforts that work best for their organizations. However, majority of devolved units in Kenya have faced a number of challenges in the health sector especially the working conditions dissatisfaction of personnel culminating in strikes. Employee unrest that has been witnessed in health care facilities has affected service delivery in public hospitals. This study therefore sought determine the effect of employees working conditions on sustainability of service delivery in devolved health services in Kericho County, Kenya. The objectives of the study will be to establish the influence of psychological and physical working conditions on sustainability of service delivery in Kericho County, devolved health services. The study adopted Expectancy theory. Descriptive research design was adopted. The study targeted a population of 450 employees from 36 public health facilities in Kericho county, with a sample size of 120 respondents. Stratified and simple random sampling was applied. Questionnaires were used to collect data from the respondents. The data collected were coded and entered into SPSS V26 program to facilitate analysis. Data was analyzed using both descriptive and inferential statistics. Findings showed that working conditions had a negative significant effect on sustainability of service delivery. The study concluded that the current working conditions reduces the sustainability of service delivery in county referral hospitals. The study recommended that there is need to formulate, implement new strategies and policies that aim at improving working conditions and employee welfare practices. The Kericho County hospital administration need to provide a working environment that makes employees feel safe and secure.

**Key words**

Sustainability, Service delivery, working, conditions

**Influence of CDF management actions about the auditor general report on financial accountability among Njoro Constituency Development Fund (CDF) in Kenya**

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**Abstract:**

The Auditor general plays a critical role in the audit of public finances including the National Government Constituency Development Fund. Public Finance Act requires that at the end of each financial year the Constituency Development Fund shall prepare financial statements. The audit of the financial statements of the Constituency Development Fund is critical in ensuring that there is financial accountability in the usage of financial resources and the

achievement of objectives of the Constituency Development Fund. This study examined influence of CDF management actions about the auditor general report on financial accountability among Njoro Constituency Development Fund (CDF) in Kenya. The study was based on the descriptive research design. The target population of this study were the CDF Accounting officers, management committee and the project coordinators of various projects within Njoro constituency. Thus, this study had a target population of 56 members that constitute the 10 CDF Accounting Officers, 30 Constituency Development Fund management committee and 16 project coordinators of various projects. Reliability of the questionnaires was tested using Cronbach's Alpha test of internal consistency. The results indicated that CDF management action significantly influence financial accountability ( $\beta=0.417$ ;  $p<0.05$ ). Therefore, it can be deduced that a unit increase in CDF management action would lead to an increase in financial accountability by a factor of 0.417. The study concludes that CDF management actions on auditor general queries significantly influence financial accountability among Njoro Constituency Development Fund (CDF) in Kenya. The study recommended that CDF should observe objectivity in taking management action to improve financial accountability of the constituencies. Amongst the aspects that the CDF officers should observe, include, elimination of the conflict of interest in the drawing of the financial reports. Moreover, further research should be carried out to investigate the moderating role of other variables on the relationship between Auditor General Audit report implementation practices and CDF performance.

**Key words**

CDF Management Action, Attitude towards Auditor General Audit Reports, Financial Accountability.

**EDUCATION  
AND  
TRAINING  
FOR  
SUSTAINABLE DEVELOPMENT**

**The influence of teachers' enthusiasm and instructional methods on learners' performance in ward secondary schools in Misungwi district, Mwanza region, Tanzania**

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**Abstract**

The purpose of the study was to examine the influence of teachers' characteristics on learners' performance in Certificate of Secondary Education Examination in Ward Secondary Schools, Misungwi District in Tanzania. Based on the study this paper examines the influence of teachers' enthusiasm and the impact of instructional methods on learners' performance in Certificate of Secondary Education Examination in ward secondary schools Misungwi District. The Variation Theory guided the study. The area of the study was Misungwi District. The study employed mixed methods approach and was conducted using descriptive survey design. The instruments used to collect data included questionnaires and interview guides. The sample was selected using stratified random sampling. One hundred and fifteen secondary school teachers were sampled from a population of four hundred thirty-eight teachers. Moreover, seven head teachers were purposively sampled from a total of twenty-three head teachers in the District. The teachers filled the questionnaire while the head teachers were interviewed. The collected data was then analysed using descriptive statistics. The study found that teacher' enthusiasm and proper application of instructional methods of teaching influenced learners' performance. The study recommended that the government should provide in-service training programmes to teachers in order to assist them to adopt modern teaching methods.

**Key words**

Teachers, Enthusiasm, Instructional Methods, Learners, Performance, Ward Secondary Schools, Misungwi District, Tanzania



## **Globalization in education, exchange programs and collaborations for sustainable development**

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Kibabii University – Kenya, <sup>2</sup>Department of arts and social sciences  
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### **Abstract**

Globalization, exchange programs and collaboration are complex phenomena that have had far reaching impact on education. Its positive effect cannot be overstated. In order to achieve the rational of the study the following two specific objectives were addressed. To assess the impact of exchange program, through collaboration among learning institutions and to establish the possibility of globalisation in education in Kenya. This study was conducted among three sample schools: Moi Girls' Eldoret from Uasin Gishu County, St. Peters' Mumias Boys from Kakamega county and Maseno School from Kisumu County (two National schools and one extra county school). This study offers to review key strategies that can be applied in collaborative teaching and engagements for effectively delivery of content and impact fundamental skills that can enhance academic performance in learning institutions. The study is unique as it offers an in-depth analysis of exchange programmes and collaborations through common setting of exams, interschool marking of exams and interschool talks by experienced teachers. It also highlights the lessons learnt through co-teaching of subjects within and without schools and approaches for rapid adoption of collaborative teaching among schools in Kenya. Output indicates that collaborative teaching and staff exchange programmes can improve the performance of students to allow them pursue not only university education but also other relevant courses at the TVET institutions. The feedback of the study will assist stakeholders in future curriculum development that encompasses exchange programs in learning institutions. The main challenge remains on employing these programmes globally. Academic exchange programs of students and collaboration of teaching is a challenge because of the differences that are found in Kenyan curriculum and syllabus compared to that of other countries.

### **Key words**

Globalization, collaboration, Sustainable, Exchange, Development

### **Strengthening TVET and industry linkages for sustainable development**

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#### **Abstract**

Linking of the TVET and industry is a major raising concern in Kenya government. The study will have sought to solve the problem of wide gap existing between TVET institution and industries linkages for sustainable development. This research focuses on the following objectives in order to determine how government sponsorship boost the training of trainees in TVET institutions, to determine how internship programs make it better for trainees to exploit their practical skills efficiently. The other objective is to equip trainees with technical know-how in their field of specialization. The study will answer the following research questions; how does government sponsorship aids in training in TVET institutions? And how do internship programs boost technical training in TVET institutions? How does technical training equip learners with technical skills in their respective area of professionalism? The research methodologies will include survey research design, simple random techniques to select 150 respondents from the study population. Questionnaires will be used in data collection. Data collection will be analyzed using descriptive statistics with aid of SPSS and results presented in tabular and graphical forms. It was found out that attachment was the most pronounced linkage between TVET institutions and industry. However, lack of initiative by TVET institution and poor response from industries were among the major challenges facing the linkage of TVET and industries. In conclusion the link between the rate of technical progress and quality of human capital has a need for those active to improve the economy. The study recommends that technical institution should have a close linkage with world of work to solicit the support of initiative training through activity such as donation of equipment and tools. Future studies can be carried out in middle level colleges and universities and privately set out training centers.

### **Towards sustainable education in Kenya: Integration of science technology and mathematics in secondary educational**

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**Abstract**

UNESCO advocates that Education for Sustainable Development (ESD) should be embedded in the curriculum in an interdisciplinary and holistic manner. To engage with ESD, the education itself should be sustainable. Sustainable education is an education that can offer possible solutions for problems encountered by a society as well as enriching what is already in place, while engaging with lifelong learning. Problem solving requires knowledge and skills from diverse disciplines, which calls for integration of disciplines. There has been research on STEM integration at global level, but the same is limited in Africa. In secondary schools in Kenya, a host of initiatives have been suggested and implemented that aim at reaffirming STEM education within or without the classroom environment. However, the initiatives are only based on specific disciplines with little or no attention to integration. In this paper, a within classroom model for STM integration for the Kenya educational context has been proposed and is seen as one aspect towards sustainable education. The model addresses the integration in terms of content from a theoretical perspective as well as empirical perspective based on mathematical content connections and conceptual connections of sciences, technology and mathematics at the secondary level of education. The proposed model is built on the classroom curriculum and extra curriculum contexts in the light of the four approaches to STEM integration. Key in this model is exploration and contextualization of each discipline separately making connections within the disciplines and across the grades, and then relating the contextualized disciplines in terms of concepts. The related concepts from the disciplines should be translated and the knowledge and skills acquired from the disciplines be applied to real world problems and projects. It is anticipated that integration will yield lifelong learning that will solve present and future problems and generate knowledge for sustainable development.

**Key words**

Sustainable education, STEM, Curriculum integration, discipline

**Determinants of youth participation in county development agenda in Kakamega County**

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**Abstract**

Youth participation in county development agenda continues to fade despite massive effort from the government and Non-Governmental Organization to empower the young people. Debate on why youth have been reluctant and

pushed to periphery of decision making despite their massive numbers have left experts and researchers scratching their heads on what really determines youth participation in county development agenda. Therefore, this study explored the determinants of youth participation in county development agenda. Further, it examined the influence of Training Opportunities on young people participation in county development agenda with the particular focus on the rationale for their participation behaviors. Target population was 2000 youths with sample of 800. Explanatory survey research design was used since it shows a cause effect relationship between determinants of youth participation. Structured questionnaires were used. Researcher tested validity of instruments by discussing them with experts and assessing compliance to suggestions. Reliability was tested using cronbach alpha to determine consistency and stability of data. Test re- test technique was done during pilot testing to test reliability of research instruments. SPSS was used to analyze data and be presented using tables because this can easily communicate the findings to readers. The study findings showed a positive high correlation between Training Opportunities and Youth Participation in Development Agenda ( $R=0.81$ ). This shows that Training positively contributes to youth participation in development agendas in Kakamega County and recommends involvement of youth in development agenda through increased training and Education. In conclusion, training increases youth participation in development agenda in Kakamega County. This study contributes to existing debate; harmonize different perspectives on what determines youth participation.

**Key words**

Training, Youth Participation, Development Agenda

**Employment opportunities and youth participation in county development projects in Kakamega County**

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**Abstract**

Youth participation in county development projects continues to worsen, though they are majority. Debate on why youth have been reluctant and pushed to periphery of decision making despite their massive numbers has escalated debate among scholars and researchers on what determines youth participation in development projects. Therefore, this study investigated the effect of employment opportunities on youth participation in county development agenda. Further, it examined the influence of Employment opportunities on

young people participation in county development agenda with the particular focus on the rationale for their participation behaviors. Target population was 1000 youths with sample size 400. Explanatory survey research design was used to show cause effect relationship between employment opportunities and youth participation. Structured questionnaires were used and researcher tested validity of instruments by discussing them with experts. Reliability was tested using cronbach alpha for consistency of data. Test re- test technique was done during pilot testing to test reliability of research instruments. SPSS was used for data analysis, presentation done using tables for easier communication of findings. The study findings reveal a positive high correlation between Employment opportunities and Youth Participation in Development projects ( $R= 0.79$ ). This shows employment opportunities positively influences youth participation in development projects in Kakamega County and recommends that government formulates policy measures and programs that champion creation of employment opportunities for youth so as to involve them in development projects since young people are energetic greater asset and engine for wealth creation for the country. In conclusion, training increases youth participation in development agenda in Kakamega County. This study will mitigate existing different, conflicting opinions on Employment opportunities and youth participation in development.

**Key words**

Employment opportunities, Youth Participation

**Relationship between Teachers' Competencies and Learners' Achievement of Linguistic Skills: A case of Public secondary schools in Bungoma County, Kenya**

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**Abstract**

In spite of the efforts to enhance the performance of English in Kenyan secondary schools, there has been a persistent challenge in using the integrated English approach on learning achievement of linguistic skills. The aim of this paper was to determine the relationship between teachers' competencies and learners' achievement of linguistic skills in secondary schools In Bungoma County, Kenya. The study utilized descriptive survey research design using mixed methods approach. A sample size of 251 teachers, 371 students and 134 heads of languages department was used. Purposive, Proportionate and simple

random sampling techniques was used to obtain the respondents. Data was collected using questionnaires and interview schedules. The validity of the instrument was tested through expert judgment while reliability was achieved using Cronbach Alpha. Quantitative data was analysed by use of frequencies and percentages. Pearson correlation analysis was used to test the relationship between independent and dependent variables. Qualitative data was analysed thematically and presented in narrations and quotations. The study found out that there was a positive correlation between teachers' competencies and learners' acquisition of linguistic skills ( $r=.363$ ;  $p=.000$ ). The study concluded that teachers' competencies positively influence learners' achievement of linguistic skills showing that enhanced teacher competencies lead to a positive enhancement of linguistic skills; writing, reading, speaking and listening. The study recommended that teachers of English in all levels need to enhance their competencies. The findings of this study will be significant to teachers of English to re-evaluate their teaching competencies and improve on them. It may also assist curriculum planners and developers at Kenya Institute of Curriculum Development (KICD) on need to organize in-service course for teachers of English in line with the revised curriculum. Besides, it may assist the educators in the university and teachers training colleges in preparing the teachers of integrated English curriculum and harmonize their programme with the changing trends in teaching of English.

**Key words**

Relationship, Teachers' Competencies, Learners, Achievement, Linguistic Skills

**Collaboration with Industry to train Technical Skills in TVET Institutions. A case study of Uasin Gishu County**

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**Abstract**

Adequate collaboration between technical and vocational education and training (TVET) institutions and industries would lead to provision of relevant practical skills for industrialization. This paper discusses the company's role in provision of training, assessment and effectiveness of training in collaboration with TVET institutions. The research objectives were to determine capacity of industry to provide technical training to trainees, identify an effective learning

management system (LMS) that links TVET institutions to industry, and identify assessment methods in line with national qualification standards. Twenty-first century skills demands that the student of today and the future acquire skills and competencies necessary for collaborating, problem solving, creative and innovative thinking, and the ability to take advantage of information and communication technology (ICT) applications. Teachers must be familiar with various pedagogical approaches and the appropriate ways to use ICT to support the development of their students' twenty-first century skills. A series of visits were made to institutes and companies participating in TVET, in order to identify their best practices through one-to-one interviews, questionnaires, observation of activities and achievements, collection and interpretation of results. An attempt was also made to interpret enterprise-based TVET using theories and explanations applied successfully in other fields, as a means to achieve an original understanding using transferable and reliable methods of how TVET works, and why and where it is appropriate. Results of the discussions aim at improving perceptions of both in-service and pre-service trainers' delivery of technical skills and competence at places of work from relevant firms.

**Key words**

Technical skills, Technology, Pedagogy, Content, Collaboration, Industry

**Effective biology practical use in pedagogy: A classroom experience**

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**Abstract**

Use of practical teaching has its history in early American education. Practical work can be conducted both in the laboratory and out of the laboratory. The purpose of this study was to find out the effectiveness of using practical work in teaching and learning of Biology. The study was guided by the following two objectives: Find out the extent of use of practical work in teaching and learning of Biology in secondary schools in Gucha south sub-county and determine the effectiveness in using practical work in teaching and learning Biology in secondary schools in Gucha south sub-county. This study was guided by Jean Piaget's theory of learning. The target population was 42 Biology teachers in Gucha south sub-county. Stratified random sampling technique was used to select six extra-county school Biology teachers, 15 county school Biology teachers 21 sub-county school Biology teachers. Data was collected by use of the Biology Teachers' Questionnaire (BTQ) and the

Biology Teaching Observation Schedule (BTOS). The data was analyzed by use of both qualitative and quantitative data analysis techniques. From the findings of the study it can be concluded that practical work is greatly used in teaching in county schools in the sub-county; however, overall the use of practical work in teaching of Biology is still low. It is also concluded that the use of practical work in the sub-county is less effective; furthermore, most of the Biology practical lessons are content-biased which hinders the effectiveness of the practical activity. The findings of this study may be important to inform the educationists and curriculum developers the extent of use of practical work in Biology. It will also inform education stakeholders on the effectiveness of using practical work in teaching and learning of Biology in Gucha south sub-county which in turn will provide room for improvement.

**Key words**

Effectiveness, Learning, Pedagogy, Practical work, Teaching

## **Tourism, hospitality, and leisure in a post-pandemic world**

**Hillary Arusei**

**Abstract**

The COVID-19 outbreak has brought unprecedented conditions to the fragile hotel and tourism industry. The highly infectious new coronavirus continues to frustrate the industry and raise serious questions about the survival of the industry now and in the future. This study addresses two important issues. The first is related to the main challenges faced by the hotel and tourism industry under current conditions; the second is related to the important apprenticeship system in the industry. The research is based on interviews with 15 participants in senior positions in the hotel industry, tourism and hotel education services. Analyzing the content of the answers to the interviews, 27 sub-topics were obtained, which were condensed into 4 main topics. The main sub-topics that appear in the qualitative consultation include: requiring employees to have multiple skills and professional development, increasing awareness about hygiene, hygiene conditions and related SOPs, optimism about the recovery of the industry, the roles of the means and the need for better crisis preparedness. Later general topics include "human resource management", "health and hygiene", "continuity" and "concern". The study critically discussed prominent issues based on existing arguments in the literature and reflected on the impact on decision makers. The main significance of the research is to determine the shape of the subject, adding to the theories about the COVID-19 pandemic and the continuous development of the tourism and hospitality industry. And management recommendations to solve many problems while drawing the



necessary lessons from the current situation. The limitations and scope of future research are also discussed.

### **Civic education for democratic voting system in Kenya**

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#### **Abstract**

Civic education seeks to enable the people to acquire knowledge, skills and personal attributes that would make them understand and appreciate the processes, values and systems by which they are governed and the means by which they can participate in those processes. In Kenya majority of Kenyans do not understand the concept clearly and that is why they make errors or poor decisions during election process, and once they vote and after voting process and declaration of results, they start lamenting. The problem is in essence many Kenyans do not know their rights and responsibilities in socio-economic, political, environmental, legal and cultural contexts of their country. Civic education refers to the type of education that equips citizens with the knowledge, skills and desired attitudes, which in turn enable the recipients to make informed participation, choices and decisions about various issues of life. The objective of the research is to study the appropriate and applicable strategy to be used to teach the Kenyans to be open minded and critical to identifying problems facing them and exploring options or solutions to such problems for example elections. The research will be survey and data will be collected through both interview and questionnaires, from the common man in the villages and civil servants in offices in urban areas. The analyzed data will be presented in graphs and tables. The findings will be vital for citizens by increasing peoples' awareness and levels of civic responsibility resulting in more stable, informed and consensus-based leadership and governance within our counties in the country.

#### **Key words**

Civic Education; Lamentation; Rights; Responsibilities

**ICT  
AND  
ENGINEERING  
FOR  
SUSTAINABLE DEVELOPMENT**

### **Production of bio plastics from maize starch**

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#### **Abstract**

Bio plastic are plastics derived from renewable biomass sources such as vegetable fats and oil maize starch. In the world synthetic plastics are turning out to be a menace because they are non bio degradable and toxic carriers. The disposal and decomposition of plastics has been an issue, currently the disposal methods employed are land filling, mechanical and chemical recycling. The increase in the rate of plastic consumption has led to the creation of more amounts of waste plastic and this in turn poses great difficulties of disposal. The development of bioplastic helps to solve many of these sustainability problems offering the potential of renewability, biodegradation and a path away from harmful additives and moreover a healthy earth. The objective of the project is to produce bio plastic which would be used instead of petroleum based plastic and also to find the properties of bio plastic and how they can be used. The method used in production involve using a mixture of maize starch, glycerol, vinegar, water and food colour. The mixture is heated to give a good yield. Results: bioplastic or green plastics are obtain after 2 days and can be manufactured in large scale. In conclusion the need for bioplastic is now more than ever as the rate of plastic production and air pollution has increased at a further rate. Therefore bioplastic can be best suited as an alternative to improve healthy life and sustain a pollution free environment.

#### **Key words**

Biodegradable, Biomass, Bio plastics,

### **Root cause analysis of critical failure modes. A case study of Olkaria 2 geothermal power plant in Kenya**

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#### **Abstract**

Recently in Kenya, there is massive investment in the exploration of geothermal energy, which is the critical source of power to the national grid. Despite considerable investment in geothermal power sources, few studies

address the asset management (maintenance) aspects of existing facilities. Therefore the objective of this paper is to carry out Root Cause Analysis (RCA) of critical equipment failure modes in the power plant by using Ishikawa diagram technique. RCA was carried out based on the prioritization process performed for the critical failure modes. This was done by the use of the Ishikawa diagram. The causes were derived from expert knowledge in the power plant and by having brainstorming sessions that were held to discuss the various possible causes of the failure mode hence subsystem failure. The construction of the Ishikawa diagram required collection of information on causes of the failure modes prioritized using the cost-based FMEA. The major categories used for grouping the root causes were Methods, Measurements, Machines, Materials, and People. Under each category, potential causes for each problem were listed. The study found out that on upon carrying out RCA, achieving high-quality maintenance requires not only prevention at the sources but also a high focus on identifying and eliminating the causes of critical failure modes and the causes of equipment deterioration. RCA information was helpful in the maintenance decision-making process.

**Key words**

Root Cause Analysis (RCA), critical failure modes, Ishikawa diagram

**Open Source LMS Selection Framework for Higher Learning Institutions: A Case of Selected Public Universities in Kenya.**

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**Abstract**

Over the past few years, Learning management Systems (LMSs) have had a significant role in the institutions of higher learning. While the precursor of the past LMSs used to be a mere training registration system, the present LMSs have the capability to deliver a much wider functionality and can play different roles that facilitate learning activities. Selection of the most appropriate LMS is a strategic decision that has a crucial role in the future success of the Computer Aided Learning (CAL) programmes. Although many models are available for evaluating LMSs, literature search indicates that little research has been undertaken regarding the selection of OS LMSs. At the same time, OSS field has extensive scope with a very wide range of similar products from different

providers. This view has been a challenge to the users when it comes to the choice and adoption of this type of software. In addition, despite the fact that Kenya's universities have embraced and use OS LMSs many institutions of higher learning in Kenya still find it a major problem when it comes to selecting appropriate LMSs. In this paper, we propose an effort to develop a model to counter OS LMSs selection in Kenya's public universities. The finding of this study will be used as a preliminary finding to aid the development of a complete model for the selection of OS LMSs in Kenya's public universities.

**Key words**

Selection, Learning Management System, Open Source software, Open Source Learning Management Systems (OS LMSs)

**Innovative design of self-Loading grains miller (poshomill)**

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**Abstract**

This paper describes the innovation design of a self-Loading Agricultural maize miller (poshomill). The model consists of Sensors/Data acquisition system, Control module christened "mteja Control Module", Actuators, devices controlled and a Liquid Crystal Display for displaying the user's interactions (commands) to the system. An interactive display and data input terminals attached to the control module makes it possible for the user to know the weight of grains presented for milling, the required payment for the service and mode of payment (mobile money or Kenya currency coins). Control module controls the parameters at play- grains weight, confirmation of payment and motor run speed duration & Horse power- in so far as the milling process, to ensure an effective and user friendly milling process. If the user cunningly or unknowingly pays through the payment module less amount from the systems' request, the milling process will on happen commensurately to the amount paid and reject the excess grains, by informing the user through the display interface to pay for the extra grains else it will eject it to a reserve holding chamber for the customer to collect it. A situation where there is a power loss during the milling process, the self-Loading Agricultural maize miller inco-operates CMOS that help it to retain and remember the milling instructions earlier accepted and continue milling process when the power supply is restored.

The “mteja Control Module”, technically replaces the human interface currently employed to administer the user’s request. This being, payment acceptance and validation for grain milling and grain weighing

**Key words**

Arduino, mteja Control Module, Sensor, Motor speed.

**Electrical engineering trainers’ pedagogy and its influence on trainees’ performance in technical education: An exploratory study of technical training institutes in Kenya.**

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**Abstract**

The relationship between trainers’ pedagogy skills and trainees’ performance cannot be overemphasized. There has been persistent relatively low performance in technical education not only in Mawego technical training institute but also in the whole country. The purpose of this study will be to explore trainers’ pedagogy and its influence on students’ technical education’s performance in public technical training institutes in Kenya. The objectives of this study will be; to establish pedagogy used in electrical engineering classrooms and its effect on electrical engineering performance, to determine trainer’s perceptions of the pedagogy used and its influence on electrical engineering performance, to explore student perceptions of trainers’ pedagogy and its impact on electrical engineering performance and to establish the pedagogy challenges and their effect on electrical engineering performance. The study adopted sequential exploratory research design within mixed method approach. This study was guided by a social constructivism theory by Levy Vygotsky (1998). The study population included 46 HODs mathematics, 134 electrical engineering teachers and 1960 diploma three electrical engineering students. Purposive and Simple random sampling techniques will be used to obtain 9 HODs electrical engineering, 40 electrical engineering teachers and 196 diploma three electrical engineering students. Data collection was done using interview, content analysis, observation, focus group and questionnaires. Validity of instruments was established. Reliability of the instruments was established through piloting of the instruments. The study used thematic analysis to analyze qualitative data while quantitative data was analyzed using descriptive statistics. The study may provide useful information that can help teachers to adapt a workable pedagogy that is likely to enhance students’ electrical engineering performance. This study will also widen the

understanding of the contribution of the variables in improving students' performance in electrical engineering.

### **An implementation of automated class attendance system based on facial detection and recognition**

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#### **Abstract**

Class attendance is a mandatory requirement amongst the TVET institutions, in Kenya. Every institution of learning has its own way of marking trainee's attendance and keeping a record of the same. Majority of the institutions mark the trainee's attendance manually using a pen and a paper while a few have adopted automated techniques such as voice recognition, eye detection, RFID, or biometric. The daily maintenance of class attendance register is not only time consuming but also difficult task. Therefore maintaining attendance register daily is a difficult and time-consuming task. It is a time consuming tasks for trainers to take attendance manually especially for large classes. Trainees have a tendency to manipulate the manual register by signing for their absent colleagues. Face detection and recognition has increased in the domain of image processing in the last few years and researchers have been able to implement it in various fields of our daily life such as for security purposes. Facebook for instance has implemented facial recognition algorithms into their website and applications, meaning that they cannot only find faces in an image; but they can also identify whose face it is as well! Facial recognition is an application of computer vision in the real world. This project aims at using a class video footage to extract picture snapshots, then detect and recognize faces from the snapshots. The detected faces will then be matched against registered faces in the database and mark student has being present or absent. This system enables trainers in learning institutions to mark learner's class attendance easily and overcome the challenges of marking attendance manually. This paper has demonstrated a smart and efficient method for taking class attendance. The primary identification for human beings is the face. Therefore, face recognition offers accurate way of overcoming ambiguities such as false attendance, time consumption, and high cost.

#### **Key words**

Face recognition, class attendance, OpenCV, face detection

## Computational modeling of selected toxic molecular products from the thermal degradation of a selected light cigarette brand

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### Abstract

The pyrolysis of tobacco gives rise to a variety of toxic organic substances such as toluene, phenol, propanol, and ethyl benzene. In this work, we simulate the pyrolysis of a selected light cigarettes between the temperatures 373K and 1223 K under conditions that simulate a normal cigarette smoking process at 1 atmosphere in increments of 50 K. The minimum energies of these compounds and their corresponding radicals (toluenyl, phenoxy, propanoxy and ethylbenzyl radicals) were computed using Gaussian 03 computational code with Molar Plesset second order Perturbation (MP2) level of theory and Hartree Fock theory. At 373 K, the minimum energy for phenol, propanol, toluene and ethyl benzene were 67.868 K cal mol<sup>-1</sup>, 73.862 K cal mol<sup>-1</sup>, 90.126 K cal mol<sup>-1</sup> and 104.628 K cal mol<sup>-1</sup> respectively. Ethylbenzene was the least stable of the all molecules while phenol was the most stable compound. A comparable development was observed as the temperature was increased from 373 K to 1223 K. Radical stabilization energies for these compounds were also calculated. The more stable a compound or a radical is, the more it persists in the environment substantially causing extensive biological and environmental impacts. Hyperchem with Quantitative Structural Activity Relationship (QSAR) technique was used to calculate the relative toxicities of ethyl benzene, phenol, propanol, and toluene, and their corresponding radicals. The toxicity values were 2.15, 0.57, 0.55 and 1.75 respectively while for the radicals it was 2.17, 1.99, 2.31 and 1.77 respectively.

### Key words

Molecular orbitals, MP2, pyrolysis, theoretical, thermolysis, tobacco



## **Benefits of adoption of biomimicry for sustainable building and construction industry in Kenya**

**Francis Wanga**

### **Abstract**

High energy use, consumption and depletion of natural sources and environmental degradation and pollution are some of the many impacts of building and construction industry globally. Hence need for adoption and implementation of bio mimicry principles. Biomimicry, the study and emulation of nature, entirely to offer sustainable solution to human challenges. An era of novel and ecofriendly sources of inspiration is heralded. The study is set to encourage the adoption and implementation of beneficial biomimetic material for sustainable construction industry. A structured questionnaire survey will be conducted with biomimicry practitioners and construction professionals as respondents. A quantitative approach to data analysis will be employed using the mean score of the factors, will be identified. It's hypothesized that adoption and implementation of biomimicry will be beneficial to sustainable building and construction industry in Kenya. Conservation of natural resources, protection of biodiversity and creation of innovative building techniques using green materials as source of inspiration are three top benefit that will be established. This systematic approach towards understanding the taxonomy of the of the benefits of biomimicry is imperative for aiding and reinforcing sustainable building and construction industry.

**HEALTH  
AND  
APPLIED SCIENCES  
FOR  
SUSTAINABLE DEVELOPMENT**

## Time series analysis and forecasting of the number of diabetes mellitus and hypertensive patients in Uasin Gishu County, Kenya

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### Abstract

Development of diabetes mellitus is characterized by a relative increase in plasma glucose values. Whether a similar phenomenon occurs during development of hypertension is not known. Elevated blood pressure is closely related to increased circulatory fluid volume and peripheral vascular resistance. Patients with diabetes mellitus experience increased peripheral artery resistance caused by vascular remodeling and increased body fluid volume associated with insulin resistance-induced hyperinsulinemia and hyperglycemia. Both of these mechanisms elevate systemic blood pressure. Thus, fully understanding the pathophysiology of hypertension in diabetes mellitus requires knowing the natural history of type 2 diabetes. Patients exhibit hyperinsulinemia with insulin resistance due to impaired glucose tolerance and early-stage diabetes. Hypertension occurs because of increased body fluid volume. After reaching mid-stage diabetes the vascular remodeling has progressed and peripheral vascular resistance also contributes to hypertension. Moreover, vascular remodeling strongly influences diabetic complications. Specifically, afferent arteriolar remodeling during diabetic nephropathy leads to increased glomerular pressure. Thus, treatment with a renin-angiotensin system inhibitor that promotes renal damage regression is critical to lowering the systemic blood pressure and dilating efferent arterioles to reduce glomerular pressure. The study aimed to use ARIMA model to analyze and forecast the number of diabetes mellitus and hypertension patients in Uasin-Gishu County. Secondary data of the number of diabetes mellitus and hypertension patients captured and recorded in hospitals in Uasin-Gishu County, Kenya was used. The number of diabetes mellitus and hypertension patients in Uasin Gishu County was decreasing annually. RStudio programming language was used to develop ARIMA model. This study used a suitable ARIMA (1,0,0) model which was capable of forecasting the number of diabetes mellitus and hypertensive patients. This model will aid statisticians and actuarial experts to timely formulate policymaking and provide required advice that will assist understand their role in demography.

### Key words

Diabetes mellitus, Hypertension, ARIMA Model, Time series

**Anthropogenic Pressure and its Effect on the Behavior and Dispersal Patterns of the Greater Kudu (*Tragelaphus strepsiceros*). Within the Lake Bogoria Landscape, Kenya**

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**Abstract**

Lake Bogoria Landscape (LBL) is home to the Greater Kudu (*Tragelaphus strepsiceros*). Its habitat constitutes the Lake Bogoria National Reserve (LBNR) and its environs. The LBNR is recognized as a World Heritage Site, a Ramsar Site and an Important Bird Area for its role in biodiversity conservation. The Greater Kudu though categorized as a species of Least Concern by the IUCN, it is considered threatened within the Lake Bogoria Landscape (LBL) due to land degradation arising from unsustainable exploitation and management of natural resources, poaching, overstocking and unsustainable farming systems. In 2019 a study was conducted to assess the impact of anthropogenic pressure on the behavior and dispersal patterns of the Greater Kudu within the LBL. The study methodologies included surveys using line transects, key informant interviews and focus group discussions. The threats to the Greater Kudu conservation within the LBL in order of severity are: *Habitat loss due to agriculture and charcoal production* > *Competition for resources from livestock keepers* > *Expansion of human settlements* > *Trophy hunting* > *Bushmeat poaching*. The pressure on the kudu population and its habitat is exacerbated by low literacy levels, socioeconomic and political marginalization, inadequate land tenure policies, vulnerability to climatic variability. Our line transect survey results indicated the Greater kudu's dispersal area during the dry period extends into agricultural fields of the neighbouring agropastoral Endorois and Illchamus communities and thus heightened human/wildlife conflicts. More than 30% of those interviewed indicated that their crops had been destroyed by wild animals including the Greater kudu. This has led to frequent and persistent food and water insecurity, famine and reduced economic opportunities for the area residents. On a positive note though, our study found out that more than 70% of the local communities embrace traditional environmental knowledge (TEK) in the conservation of wildlife including the Greater kudu. Further, more than 80% of them are receptive local, national and global initiatives such as those proposed by the GEF/SGP in the conservation of biodiversity and improvement of livelihoods. We recommend integration of TEK into the government and non-

governmental wildlife conservation interventions, and involvement of the local people in addressing the threats facing the Greater Kudu. Further, there is need for increased funding for the Greater Kudu conservation initiatives within the Bogoria Landscape.

**Key words**

Greater Kudu, Lake Bogoria Landscape, Ramsar Site, Traditional Environmental Knowledge, Anthropogenic Pressure

**Computational Screening of Zeolites for the Adsorption of Selected Pharmaceutical Pollutants**

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**Abstract**

Molecular simulations have been used as a screening tool to identify promising zeolites for the removal of selected pharmaceutical pollutants. 40 zeolites with different structural and chemical configurations were studied. Galophosphate cloverite (CLO) of the chemical formula,  $F_{24}Ga_{96}P_{96}O_{372}(OH)_{24}$ , with pores of 20 rings and the lowest observed bulk density, showed exceptionally preferred adsorption of diclofenac [2-(2,6-dichlorophenyl)amino benzeneacetic acid], ciprofloxacin [1,3,7-Trimethylpurine- 2,6-dione] and chloramphenicol [2,2-dichloro-N-[(1R,2IR)-1, 3-dihydroxy-1-(4- nitrophenyl) propan-2-yl acetamide]. This selectivity was attributed to the geometry and structural composition of the cavities. We also investigated the most stable adsorbed compositions of the pollutants in the CLO zeolite. Our calculations show that diclofenac, ciprofloxacin and chloramphenicol molecules are adsorbed into the pores with adsorption energies of -78.23, -173.68 and -84.46 kcal/mol respectively. Additional calculations were also made to obtain detailed information on desorbed products. It is seen that dechlorination is the most energetically preferred process compared to dehydrogenation and dehydroxylation.

**Key words**

Monte Carlo simulation, Adsorption isotherms, pharmaceutical pollutants, Zeolites

**Microbial Levels in Drinking Water, and Prevalence of Waterborne Diseases in Marigat Urban Centre Baringo County, Kenya**

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**Abstract**

Access to safe water is a precondition for health and is a basic human right. It is however worth noting that approximately 20% of the global population lack access to potable water whereas over 30% lack access to basic sanitation. The situation is much worse in the arid and semi-arid lands (ASALs) in the developing countries. It is because of the foregoing water and sanitation situation that 3.4 million deaths are reported annually. An assessment of the microbiological water quality and prevalence of waterborne diseases was conducted in Marigat, a sprawling urban area in the ASALs of northern Kenya. We employed a mixed methods research design in this study: Field sampling followed by laboratory measurements, and a Cross-sectional household survey. A structured questionnaire was administered to household heads. Ten water samples were collected from the drinking water sources and at the household level (Point of Use) during the dry and wet seasons and analyzed for *E. coli* and TC bacteria using the MPN method. Health records of persons that sought healthcare services at various Marigat health centres were reviewed to determine prevalence of waterborne diseases. The *E. coli* levels in household water samples ranged from 200cfu/100ml to 2500cfu/100ml, whereas the range was 25cfu/100ml to 4575cfu/100ml for Total Coliforms. The reported microbial levels for *E. coli* and Total Coliforms were above the World Health Organization guidelines for drinking water. The study findings indicated that there was a significant association between level of education and covering of water storage container ( $P < 0.05$ ). There was a significant interaction between the point of water sources and season in terms of *E. coli* and TC ( $P < 0.01$ ) TC ( $P < 0.05$ ) respectively. Nearly half of the respondents indicated that diarrhea and typhoid were the most prevalent waterborne diseases in children under the age of 5 years during dry season. Typhoid and cholera were more prevalent during the wet season. Findings of this study showed that the water sources in

the study area are contaminated and hence unsuitable for human consumption. We recommend intensification of public health awareness campaigns on water, sanitation, and hygiene in the study area. Finally, relevant public health agencies at both county and national levels need to prioritize and invest in water and sanitation infrastructures.

**Key words**

Microbiological water quality, Coliforms, Sanitation, Prevalence, Waterborne diseases

**Pollution levels of Cancerous Polycyclic Aromatic Hydrocarbons in water from L. Victoria Kenya**

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**Abstract**

Waste water treatment has been reported as an overbearing environmental challenge due to industrial, agricultural and domestic activities in the vicinity of L. Victoria. While data on the water quality is enormous, that on PAHs presents a research gap. The 16 priority polycyclic aromatic hydrocarbons (PAHs) in the environment have increasingly become a health risk causing cancer as a result of their sources are both natural and anthropogenic activities, and they have been monitored as persistent pollutants because of their high toxicity, carcinogenicity and mutagenicity. Several regulatory agencies recommend that PAHs to be monitored in matrices particularly water, soil and sediments. With the World Health Organization (WHO) it recommends allowable limit of 50ng/L in water, and 0.05mg/kg in sediments and soil expressed as dry matter. The aim of the study was to determine the levels of PAHs in water. Samples were collected during the wet and dry seasons. GC-MS was used for identification and quantification of PAHs. The data obtained was presented in tables and graphs. The sum of the concentrations of PAHs in water ranged from  $0.046 \pm 0.006$  to  $0.092 \pm 0.003$  ng/L during wet season and  $0.026 \pm 0.003$  to  $0.046 \pm 0.011$  ng/L in the dry season. Higher levels were observed in during wet season. The results show that water, from L. Victoria was contaminated with PAHs although the levels were below the recommended limits by WHO of 50 ng/L and in water. However, this should not be taken for granted continuous monitoring is expected in order to ensure that their concentration remains the same as they are known to be persistent.

**Key words**

Polycyclic Aromatic Hydrocarbons, cancer, pollution, Environment

**Public Policy Implementation Challenges; An Assessment of  
Environmental Management and Coordination Act, 2017 (Cap 387)  
in Bomet East Sub-County-Kenya**

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**Abstract**

Globally, over 2.7 billion plastic bags are consumed daily especially through packaging and transportation of goods and thus posing a serious environmental threat. Consequently, various states have taken initiatives to either completely ban production, importation and use of plastic bags or impose heavy taxation on its production. Through Environmental Management and Coordination Act (Cap 387) of 2017, the government of the Republic of Kenya completely banned production, importation and use of plastic bags. Despite existence of the legislation, the use of plastic bags still continues to be a menace to the environment in various parts of the country and thus casting doubt on the efficacy of the legislation in addressing plastic bags menace. This research sought to interrogate the various challenges constraining successful implementation of Environmental Management and Coordination Act, 2017 (Cap 387) in Bomet East Sub-County-Kenya. The study adopted a survey research design and a sample of 384 respondents mainly drawn from National Environmental and Management Authority (NEMA), Local administration, registered Small and Medium Enterprises (SMEs), officials from the Ministry of Environment, Water and Natural Resources as well as the local population. Interview schedule and questionnaire were adopted as key research instruments in collection of both qualitative and quantitative data relevant to the study. In relation to data analysis, this study utilized Statistical Package for Social Sciences (SPSS) in the organization and analysis of quantitative data collected from the closed ended question and the analyzed data were presented using frequency and percentage tables. Qualitative data from the open ended questions and further probing were classified into various themes on the basis of their central focus for the purpose of presentation and analysis. Qualitative analysis included presentation of quotes from different respondents and the data gathered from the field were integrated with available secondary data for the purpose of interpretation. Ethical consideration including maintenance of confidentiality, anonymity and informed consent of the respondents was adhered to. Based on this study, it was established that the implementation of EMCA, 2017 (Cap 387) had been hampered by inadequate funding on enforcement of EMCA, 2017, inadequate staffing of NEMA, ignorance of the



legislation by the members of the public, corruption among government officials and lack of regularized inspection on implementation. It is recommended that in order to strengthen institutional and human resource capacity of NEMA in fulfilling its mandate of enforcing ban on plastic bags, funding of the Agency should be increased. Additionally, more civic education regarding the ban on plastic should be done especially in the various rural counties.

**Key words**

Plastic bags, EMCA, 2017, Environment, Stakeholders, Kenya

**The role of phytochemicals in prevention and control of chronic diseases**

**Monicah Kibe\***

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**Abstract**

Overproduction of oxidants (reactive oxygen and nitrogen species) in human body can cause an imbalance and lead to oxidative damage to large biomolecules such as proteins, lipids and DNA (Deoxyribonucleic acid) which is responsible for the development of chronic diseases. Metabolic diseases are associated to our daily lifestyle, mostly unbalanced energy-rich diet lacking fiber and bioactive compounds such as micronutrients and phytochemicals. Scavenging of this oxidant is thought to be an effective measure to depress the level of oxidative stress. Adequate dietary intake of fruits and vegetables may have protective effects against a number of diseases due to biological protective effects of phytochemicals in these foods. The reviewed article was obtained by using research tools to search for studies done within the year 2013 and 2017. Key words such as phytochemicals, antioxidants, polyphenols, bioavailability and health were used in the searching. Studies were searched in journals such as PUBMED, Science direct and Mendeley desktop used in the writing and referencing of the article. Antioxidants found in popularly consumed vegetables, including red beans, have found to prevent diabetic complications. Healthy eating practices that emphasize consumption of plant based foods plays vital roles in the prevention of chronic diseases such as cancer, Alzheimer, cataract, heart diseases, age related function decline and stroke. Health practitioners should emphasize consumption of plant based foods as per the recommendations since they play a big role in the prevention and control of chronic diseases that are of high prevalence and affecting people all over the world

**Adoption of solar energy and diffusion of new solar technology products for domestic and commercial use in Kenya: Critical analysis**

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**Abstract**

Energy conservation refers to processes and efforts that are put in by the governments and people to reduce the rate of energy consumption in working environments. Energy sustainability includes strategies that can enhance 100% energy conservation, through adoption, diffusion and implementation of renewable energy conservation technologies. This paper focuses on effective strategies that can help Kenya achieve high energy efficiency index. To achieve these, the research proposes the need for Kenyan commercial sectors and households to adopt efficient technologies that conserve the energy. The paper suggests adoption of such technologies and highlights efficient methodology that can help the country conserve energy in industries or homes and any other places of domestic and commercial use. I propose full deployment and implementation of solar photovoltaic systems for heating, communication and lighting can contribute to achieving energy sustainability objectives. This research paper therefore, intends to describe energy efficiency, and explains why solar energy is better than the use of other forms of energy. It also gives a recommendation on the adoption and diffusion of new solar energy technologies that can be used to achieve such energy efficiencies in the near future. In my study I have adopted optical modeling methodology, an exhaustive and fast numerical simulation of renewable energy technologies. This research methodology is adopted so as to exclude all unfavorable parameter combinations for the experimental energy conservation technologies to be adopted and also help in guiding my search for new techniques and materials. Using this methodology, I dive into the need for Kenya to conserve its energy through adoption of solar technologies such as: Advanced window controls, Next-gen insulation, reflective roofing technology, high-tech thermostats technology, wireless outlet controls technology, electricity use monitor technology, and solar panel technology.

**Key words**

Energy, Renewable Energy, Conservation, Solar,

## Effects of electronic waste disposal on environmental conservation in Kenya Critical review

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### Abstract

The issue of unsafe waste disposal is becoming an increasing threatening problem since it contains toxic substances that can severely harm both human and environment. This problem is likely to worsen if plans are not established to avoid these environmental and health consequences. Technological revolution, human mentality and population have led to increase in consumer demand for electronic gadgets which results in increase in electronic waste. This paper is not only addressing the effects of e-waste to the environment but also presents the managerial efforts taken in this regard to deal with the electronic waste. This paper undertakes a review of existing literature highlighting the effects of electronic waste on the environment through a desktop research.

### Key words

E-Waste, Environmental conservation, waste disposal

## Principle Component Analysis of the Effects of Effluents from Mumias Sugar Factory on Water Quality of River Nzoia, Kenya

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### Abstract

Principle Component Analysis (PCA) was used to probe the effects of effluents from Mumias sugar factory on River Nzoia waters downstream of the discharge points in relation to variations in water quality. The study sort to deal with the insignificant exploration of the linkage between sugar factory physico-chemical water quality parameters and agricultural run-offs. A randomized experimental design and convenient upstream-downstream, independently repeated random sampling design determined physico-chemical loads of the Nzoia River. EXCEL 2007 for windows 7 was used to perform univariate analysis while STATISTICA, version 8 involved multivariate statistical analysis and PCA (< 0.05). A multiple criterion selected four (4) most significant principal

components that yielded 99.90% of the total variance of the physico-chemical parameters corresponding to combined industrial (sugar) and domestic effluents; physico-chemical; soil leaching and agricultural run-off process variability. This may be due to partially decayed organic matters from domestic and sugar effluents discharge, soil leaching or agricultural run-off process variability, and imbalance of free metal availability due to physico-chemical process. Findings from the study can enable achievement of an enhanced biomonitoring programs on the water quality within the Nzoia river water basin and other similar freshwater bodies. Mumias Sugar Company should consider a closed circle process, improve the current technology for sugar and domestic effluent treatment and; monitor the soils which likely impact on the Nzoia River from the run-offs. The National Environment Management Authority (NEMA) needs to incorporate the multiple criteria into indices based on multimeritics. Food security and more efficient sugar manufacturing industrial practices can eventually be achieved.

**Key words**

PCA, Effluents, Quality, Mumias Sugar Factory, Nzoia River

**CROSS - CUTTING**

**Challenges Facing Writing of Research Papers in TVET Institutions. A Case of Study Students in the Eldoret National Polytechnic**

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**Abstract**

A research paper is piece of academic writing that provides analysis, interpretation and agreements based on the in-depth independent research. They are intended to demonstrate a students' academic knowledge of the subject. Despite of the efforts and investments taken and posters developed by many institutions, still students find it difficult to participate in writing research papers. The general objective of this paper is to determine the challenges facing writing of research papers in TVET intuitions. The research design used was a survey which utilized questionnaires for data collection. The questionnaire used a for data collection adopted use of both open ended and closed questions. Descriptive statistical graphs, tables and charts were used to analyze the data. It was concluded that research has become difficult when researcher face several difficulties during their research work. This review study revealed that almost all researchers face difficulties like, Insufficient funds, unawareness, lack of experience and poor motivation among others, during their research work. There is an extreme need to sort out the above problems and issues so that researchers could focus on research work rather than solving these inconveniencies. The study above therefore recommends that, the government should allocate finances that will cater for and help in researches by students in all institutions. Technology in ICT, tools and internet should be provided and improve those that are in place for easier carrying out of researches by students. Experts should be engaged in training the students who are willing to participate in writing of the research papers. Institutions should in every department give employs and commit reliable supervisors for all willing students to guide them in writing of the papers. As an appreciation and method of motivating research writers, the government in association with institutions, should provide allowance to students who participate or engage in writing of the research papers.

**Key words**

Funds, awareness, experience and motivation

**Gender representation and career choices in TVET: A thematic analysis of the case of the Eldoret National Polytechnic, Uasin Gishu Kenya**

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**Abstract**

Technical and Vocational Training is a major player in development of knowledge and skills necessary for National Development. In Kenya, the growth in number of female enrolments in Technical subjects has improved but still remains low (Republic of Kenya, 2017). This study sought to carry out a thematic analysis of gender representation and factors influencing choice of technical courses among female trainees. The specific objectives of the study were to establish the gender representation in technical and business courses and to explore factors influencing choice of technical subjects among female students at the Eldoret National polytechnic, Kenya. The study was guided by Donald Super's Vocational Development theory (1957), who postulated that one's career concept is directly influenced by personality, abilities, interests, experiences and values. The study was a case study targeting female students enrolled at the Eldoret National polytechnic, Eldoret Kenya (TENP). The study adopted mixed methods research design and anchored in constructivism, which embraces qualitative research. The study targeted the trainees drawn from all the academic departments at TENP. A sample size of 353 trainees were selected for the study. Questionnaires consisting of both closed and open-ended items were utilized for the study. Reliability of the questionnaire was tested during piloting. Data was analyzed with the aid of SPSS ver. 27 and statistics used included frequencies, percentages and means. Presentation was made using tables and charts. The study findings indicated that most students avoided physics in high school but preferred Chemistry and Biology. There was a likelihood of a high performance in physics for higher achievers in the other sciences. Performance of trainees was normal with a higher proportion 36(66.7%) attaining credits, followed by passes 10(18.5%) then distinctions 4(7.4%). There was a higher likelihood that, whenever a trainee was given the freedom to choose subjects, there is a higher chance that the student will perform well in the chosen subjects and the course selected to pursue at college had a higher chance of being related to those subjects. The study recommended robust career guidance at the secondary school level and advocacy for young women to take up technical courses traditionally a preserve of men.

**Key words**

Technical courses, business courses, Technical and Vocational Training, Sciences Courses

**Assessing the quality of TENP services and customer satisfaction**

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**Abstract**

This study was aimed at assessing the quality of TENP services on customer satisfaction. This is because quality service survey is important in monitoring the quality of services and safeguard the interest of stakeholders through the fulfilment of their real needs and wants. The level of satisfaction and service delivery in this study was based primarily on the data collected through five dimensions of education service quality provided by SERVQUAL model. The study employed a survey research design approach where a target of 110 students from 11 departments were targeted. A random sample of 108 students studying in an institution of higher learning was selected for this study. Questionnaire containing close and open ended questions were administered to the students using a stratified random sampling technique. Statistical analysis (descriptive) and thematic analysis (qualitative data) had been employed to analyze the intensity of these five dimensions and their influence on student satisfaction. The results indicated that the service areas at the institution were rated average in satisfying customer needs. A neutral rating was provided on the quality service dimensions of responsiveness, reliability, assurance, and tangibility while staff empathy was rated poorly in satisfying customer needs. This study provides very useful information for the stakeholder to plan and draw appropriate strategies for the dimensions that need further improvement as recommended. More importantly, education service quality will determine the sustainability of an institution by looking at the competitiveness of education setting at national and international levels.

**Key words**

Customer satisfaction, quality service, SERVQUAL model, students, Technical Education



**Challenges of using ODEL for students in technical education departments in technical and vocational education training institutions in Kenya**

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**Abstract**

Open Distance Electronic Learning (ODEL) has become a new normal for learning institutions across the globe. The Corona pandemic brought a paradigm shift to learning institutions though with challenges but many are on the track with ODEL apart from the student in technical education including electrical, mechanical, and building depart. The objective of the study was; to assess the challenge that students face when using the ODEL in TVET institutions; establish the critical success factors of using ODEL in their operations and identify types of ODEL platforms that can be used for ODEL learning in TVET institutions. ODEL has been defined as the use of computers and networks in providing information, sharing knowledge and skills, and the system supports collaborative communication electronically. For TVET institutions to implement the ODEL portal, they need to understand the features of the portal, the implementation challenges that technical education face when using the ODEL and evaluate the available platforms so that they can incorporate it well with their missions, visions, and values. The study reviews literature and gives scholarly information on the needs and benefits of ODEL and reviewing the challenges that TVET institutions may encounter during and after. It also unveils some of the views from researchers and other institutes in the world concerning the readiness, implementation challenges and the benefits, and types of platforms available for adoption. The study adopted a descriptive survey and naturalistic research design. It used a sample of 1200 comprising 5 heads of departments, 35 teachers, and 1155 students. The study found that the TIVET institutions were not ready to use the ODEL learning system especially in technical education departments and trainers were finding it hard to deliver especially on practical subjects, the institution's management had not acquired the right learning management system that supports ODEL and mot of TVET institutions didn't have a policy or department that could steer up the ODEL learning. The study recommends that the right system should be put in place to support ODEL as the way of learning with the current shifts in the globe, awareness and empowerment should be emphasized to both the students and the trainers. Trainers should also commit themselves to better their skills and knowledge on the use of ODEL

**Key words**

ODEL, learning management system, TVET, operations.

### **A discourse construction of gender in selected Lubukusu initiation songs**

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#### **Abstract**

Gender inequality is a global issue, with efforts to realise equality being hindered by sociocultural factors in different societies. Despite efforts that have been made to address gender equality in the society, gender bias continues to persist in both public and private spheres especially the economic, political and social aspects of life. The purpose of the paper is to investigate stereotypical constructions of gender in Lubukusu initiation songs and how social actors are represented. The songs were collected during the 2018 initiation ceremonies in Bungoma South Sub-County, Kenya. Content analysis was used to analyse data. The research was guided by Critical Discourse Analysis theory. Initial findings reveal that male dominance and female subordination is the norm; the linguistic choices made disseminate stereotypical gender ideologies while maintaining the status quo. The women's role in Lubukusu initiation songs is seen as subordinate to men. Gender inequality can be identified as a risk and a limiting factor for both men and women. The goal of this paper is to raise awareness of how gender asymmetries and power relations are perpetuated through discourse; the findings may be used in practical applications to combat all forms of social discrimination through language.

#### **Key words**

Discourse, discourse construction, gender, gender inequality, initiation songs, mother language

### **Prevalence of child sexual abuse among pupils in Kisii County**

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#### **Abstract**

Child sexual abuse (CSA) is both a social and public health concern locally and globally. A mutual mistaken belief on child sexual abuse is that, it is uncommon occurrence committed against girls by male strangers in both rural and urban areas in Kenya. Notwithstanding myriad research on CSA, little is

known about its Prevalence. It occurs at all levels of the society affecting not only girls but also boys. The purpose of this study therefore was to investigate the prevalence rate of child sexual abuse among pupils. The study was informed by the Attachment Theory which suggests that children's lives are centered initially on their parents, the family environment being their primary agent of socialization. Systematic random sampling was used to select the respondents to ensure that the sample was a representative. The study utilized descriptive survey design. The study population was 700 pupils out of which a sample size of 100 (14 percent) pupils was selected. The study used questionnaires administered to each respondent. The researcher administered the questionnaires individually to all respondents. The study found out that threats from perpetrators were preventing the disclosure of child sexual abuse. The research recommends that research, programs and policies should focus on child protection. The patriarchal narrative of manhood needs to change and boys should read from a different script on their roles and place in the society.

**Key words**

Attachment theory, Patriarchal narrative, Socialization, perpetrators.

**Awareness level of pupils on CSA in EMESA sub-location, Kisii County**

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**Abstract**

Child abuse as recorded in literature in many parts of the world continues to affect the children conventionally. The abuse dates back to ancient civilizations as seen in the reports of female genital mutilation, infanticide, neglect, abandonment and child trafficking. Child abuse is a worldwide problem that occur in various forms which is profoundly entrenched in cultural, economic and social practices. It occurs in different forms which are: physical, emotional neglect and sexual abuse. Child sexual abuse (CSA) is a global problem which cuts across all status boundaries ranging from social, economic, cultural and political. Despite a myriad research on CSA, its awareness level has been difficulty to estimate among pupils. This study therefore concentrated on awareness level of pupils on CSA. The study used systematic sampling to select pupils, convenience sampling to select parents/guardian and purposive sampling to select key informants. The sample size was 100 pupils, 100 parents/guardians and 10 key informants. The findings of the study reveal that the knowledge of teachers, parents and other caregivers on CSA preventions directly influences the child's

prevention awareness. The study recommends a dialogue among the religious institutions, policy formulators, teachers and parents the introduction of sex education both at school and societal level to equip the learners with the possible refusal technics, abuser identification, where to report in the event of abuse and the consequences of the abuse and the emphasize should not only be on girls but also boys since all can be sexually a bused.

**Key words**

Child abuse, Child Sexual abuse, Prevention awareness, Female genital mutilation, Sex education

**Teachers' perceptions on the factors affecting implementation of early childhood education curriculum in Chagamwe, Mombasa, Kenya**

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**Abstract**

The study examined teachers' perceptions on factors affecting implementation of Early Childhood Education curriculum in Chagamwe Division Mombasa District. The objectives of the study were to: assess if teachers translated the curriculum as originally designed by NACECE, assess whether parents and teachers are informed about the early childhood curriculum and examine the attitudes of teachers and parents towards the curriculum. The study used a mixed research approach and descriptive survey design. The population was 300 preschool teachers. Sample included 30 pre-school teachers. Stratified random sampling was used to select the sample. The study used: questionnaires, interview guide and observation checklist to gather information from the respondents. The instruments were subjected to validity and reliability. Quantitative data was analyzed using descriptive statistics while qualitative data was analyzed using themes. The study findings revealed that the pre-school teachers faced a lot of challenges in translating the curriculum as required because they lacked resources required for curriculum implementation such as teaching guides. The study also found that teachers were not fully aware of the curriculum which was used, not all teachers had a positive attitude towards the curriculum. This meant a slower rate of adoption; the child is not enabled to enjoy play and enriching experiences. It was recommended that teachers ought to be provided with more opportunities to understand early childhood curriculum in order to improve the welfare of the child; communicate to parents about their children; familiarize parents with the early

childhood programme and remind parents about obligations to the preschool and the child this will provide a proper environment whereby early childhood education will be smoothly implemented. Efforts need to be put in place to ensure that materials, for example, guide books needed by pre-school teachers are available.

**Key words**

Pre schools teacher, teachers' perception, early childhood education, attitude towards children.

**Pine tree as a source used to lit charcoal stoves and a renewable energy for sustainable development**

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**Abstract**

Pine trees are widely distributed conifers, most common in cool temperate regions. The pine tree was introduced in Kenya by foreigners. It is grown in most towns and round in most homesteads along the fences in Kenya. Pine has been discovered through innovation to be a source of energy when cut /chopped into small pieces and used to lit charcoal stoves and firewood more easily and quickly. The problem is that many people are cutting pine trees and splitting into pieces to be sold in market. As a consequence it is becoming extinct in Trans-Nzoia. The objective is to study the best strategy to be used to sensitize the people to preserve/conservate pine tree till mature stage and use it as a source of renewable energy. The research employed survey method and data collected through oral interview from 300 small scale businesspersons who sale punches of small pieces of pine in open markets in Kitale town. Sample size of 5% was drawn from the total population. The findings are: one, pine trees chopped pieces are used to lit charcoal stoves in western Kenya especially in Kitale town where it is sold; pine tree is grouped into seven clusters such as sugar pine, pitch pine, longleaf pine, ponderosa pine, lodge pole pine, Virginia pine and pinyon pine. Two, Pine tree is going to be extinct in Trans-Nzoia region if it not planted after cutting. The paper concludes that pine tree is a source of energy which can be renewed for sustainable development in urban and rural communities. It is recommended that people to be encouraged to plant more pine trees as they cut to be a source of generating income in western region.

**Key words**

Pine tree, Renewable energy, sensitization, sustainable development

## **Overcoming Gender and Development Challenges: Lessons Learnt from Women in the Lake Bogoria Agropastoralists Communities, Kenya**

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### **Abstract**

The drylands (Arid and Semi-Arid Lands or ASAL) of Kenya make up 84% of the total land surface, support approximately 34 % of the country's population, and account for more than 80% of the country's eco-tourism interests and up to 75% of its wildlife populations. The Lake Bogoria Landscape (LBL) is in South Baringo lies within Ecological zone V and is among the most impoverished and least developed areas in the Kenya, with the human poverty index of 30.6%. In the LBL, women and youth have been excluded from livestock keeping activities. Pastoralists' societies are patriarchal and thus a lot of gender stereotyping as to the role of women in livestock production. Men have control over the livestock production with women having little or no say over proceeds from livestock sales. A Cross sectional social survey was conducted in the LBL to assess strategies and interventions that women have adopted to overcome socio-cultural and economic challenges. This was complemented with key informant interviews and focused group discussions. Our findings indicate that the perception over women participation in livestock production is slowly changing and women are increasingly getting actively involved in decision-making processes and pastoral livelihood practices. Over 70% of the respondents indicated that the 2010 Kenyan Constitution and government's focus on gender issues including the creation of a Ministry of Gender, Youth and Sports have contributed to the increased participation of women in economic development activities. Many women have come together and formed community-based organizations (CBOs) that are run by women and predominantly focused on empowering themselves economically, politically and socially. More than 90% of the women reported that they belong to more than one CBO, and that they have used the knowledge and skills and financial returns from their CBOs to meet the health and educational needs of their children. More than half of the women participate in livestock production activities including beekeeping, pasture production, and marketing of the associated products. 75% of the women-led CBOs in the LBL focus on parts of livestock value chains based on their strengths and thus remain competitive. Increased participation by women in socioeconomic activities within the LBL has been achieved through creation of awareness, building self confidence among women, educating the girl child, reducing vulnerability to violence and

exploitation, shared responsibilities, acquisition of skills and financial support from county and national government as well as development partners. We conclude that women in the LBL have demonstrated that with the necessary governance and financial support from development partners and government, women can make a significant contribution to the socioeconomic development of an area.

**Key words**

ASALs; Gender; Governance; Livestock; Value chain

**Pedagogical Approaches Employed in Electronic Learning in the Corona Pandemic Time: A Case of Selected Tertiary Institutions in Kisii County**

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**Abstract**

In the wake of COVID-19, ‘‘business as usual’’ has been disrupted. The pandemic has necessitated sudden and drastic transformation in many sectors of the global community. Education is one of the sectors which have experienced unexpected changes all over the world. Many learning institutions have experienced disruptions to each aspect of the instructional core: teachers, students and content. Many institutions have been closed down to minimize the face to face contact. Subsequently, majority of learning institutions, the world over and Kenya in particular have transitioned to electronic learning. Therefore this paper focuses on selected tertiary institutions and will examine the pedagogical approaches adopted in e-learning during COVID-19 pandemic period. The study will be significant in establishing whether learning institutions in Kenya and by generalization elsewhere are prepared to deliver content using e-learning platforms in case of uncertainties. The paper will prompt questions such as, are our tertiary institutions ready to roll out e-learning , is the government supporting technology to improve on instruction, do our students have access to devices and internet connectivity?

**Key words**

COVID-19, pedagogy,e-learning,Pandemic, tertiary institutions, technology.

**Natural resources management and sustainable development: A case of Kisii soapstone, Tabaka region**

**Maosa Robert\***

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**Abstract**

Natural resource-based communities (communities with intimate ties to natural resources) are uniquely situated in the intersection of human society and the environment. Soapstone mining in Kenya especially in Kisii region is historical and its exploitation has been conducted from time immemorial with no regard to the environment. As Barry Dalal-Clayton and Stephen Bass (2002) puts it, that achieving sustainable development will require deep structural changes and new ways of working in all areas of economic, social and political life. This paper seeks to engage in an interdisciplinary and international dialogue on the interrelationships of society, natural resources, and sustainability at the community level. The community approach to natural resource use and conservation holds a pivotal role in the study of the relationships between community and natural resources. Human dimensions were generally neglected in traditional practices of environmental and natural resource management. Early theories, such as Malthusianism, suggest simplistic negative relationships between population growth and the natural environment. Such views essentially put people and the environment in opposition. Population pressure was viewed as a root cause of environmental degradation and resource depletion. Residents in rural communities often directly rely on natural resources for subsistence, hence the needs of local communities were considered to be incompatible with the goals of environmental conservation. Meanwhile, communally owned resources were believed to be subject to “tragic” degradation due to overpopulation and the lack of clearly articulated property rights. All these perspectives implied that natural resources could only be saved through the coercive management of the state or through the privatization of resources. The paper aims at explaining the theoretical and empirical perspectives that inform resource management for sustainable development. The paper also provides recommendations that can guide policy formation for the sustainable development of the soapstone industry in Kenya.



**Assessing strategic gender needs of technical and vocational training institutes in Uasin Gishu County: The case of Eldoret National Polytechnic**

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**Abstract**

According to the World Economic Forum Report (2018), the Global Gender Index shows a 32% gap in leadership and technology among men and women, despite the high enrollments in secondary education at 65% and 66% for girls and boys and colleges and universities attendance at 39% and 34% for women and men, respectively. There are still high gender gaps when youths transit from secondary schools to tertiary education in Kenya, with more girls than boys remaining out of schools. Some of the reasons for low transition include cultural and traditional barriers, attitudes towards women, financial and geographical barriers, lack of family support and teen pregnancy. The broad objective was to empower technical-vocational institutions to actively participate and be agents of change in gender roles, structures, and socialization processes locally, nationally, and internationally. We developed a framework to conduct a baseline needs assessment survey to assess the strategic gender needs of the Eldoret National Polytechnic in Uasin Gishu County Kenya. This was done through online surveys sent to students (n=247), staff (n=68) and industry partners (n=16). This was achieved through online surveys and key informant interviews with relevant stakeholders. The target population was students, staff, alumni, and stakeholders from the industry including employers, cultural and religious leaders. The findings from this study provide baseline information on gender needs that will inform the development of tools that will be used to train the staff and students to enable the institution to be more proactive in promoting a gender-sensitive culture. The result will be enhanced capacity of the institution to identify and address gender gaps through improved reporting and monitoring of gender and improved policies to inform stakeholders to promote inclusivity in their engagements with the institution.

**Key words**

Gender Index, Gender Gap, Gender Needs, Gender Sensitive Barriers, Attitudes.

### **Preventive Interventions of Obstetric Fistula in Kenya, Social Work's Perspective**

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#### **Abstract**

*Data on women who experience obstetric fistula paints an often-tragic picture. The Obstetric fistulas are childbearing injuries that present a major public health issue, especially in the developing context that calls for social workers intervention in assessment and psychosocial counselling. The goal of this qualitative study was to gain an understanding of the lived experience of obstetric fistula in Kenya and its prevention. It brings together the literature on the causes, prevention, management, client rights and counselling on obstetric fistula. Furthermore, it also aims to identify gaps in the research that need to be addressed. Through content analysis, the study identifies that extensive research has been carried out on the factors causing this injury, the main factors being complications during labour, three phases of delay, and culture. Nonetheless, there remains a scanty literature detailing preventive measures. Suggested preventive measures target the Social workers, the community and healthcare facilities. The literature also highlights the need for increased governmental support, as a means of preventing the development of fistulas. Using narrative review methods, the study identify that the research focus remains primarily on the causes of obstetric fistula and ways of managing the injury, while paying less attention to means of preventing this injury. The study therefore recommends further exploration of preventive measures.*

#### **Key words**

Causes; Prevention; Management; Client rights; Counselling

### **Attitudes, perception, and effects of Euthanasia on Families in wetlands in Kenya**

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#### **Abstract**

Euthanasia decision making is perhaps the most difficult practice situation faced by health care social workers. Complex ethical issues arise

from decisions regarding use of advancing medical technologies and/or other artificial treatments that may prolong life and compromise its quality. NASW has set forth a policy to help guide social workers dealing with euthanasia decisions and the preservation of client self-determination in these situations. Moreover, the Public and healthcare professionals differ in their attitudes, perception and effects on euthanasia and physician-assisted suicide (PAS). In addition to medical training and experience, religiosity, locus of control and patient characteristics (eg, patient age, pain levels, number of euthanasia requests) are known influencing factors. This study is based on secondary data collected through review of studies, reports, policy documents and surveys from various data sets from national, regional and international organizations more especially in social work field. Multivariate analyses reveal differing predictor models for attitudes towards euthanasia and PAS, and confirm the importance of individual differences in determining these attitudes. Specific implications for PAS and its interface with the social work profession are described with respect to multiculturalism; identity; perceptions of disease, illness, and pain; attitudes towards therapy; family decision making; ethics; and professional roles. Ethical dilemmas most often faced in end-of-life care situations relate primarily to issues of communication between and among patients, families, and professionals. Practitioners indicate that more specific practice guidelines and increased education regarding bioethics and issues of end-of-life care are needed to be effective in end-of-life decision making.

**Key words**

Euthanasia , physician-assisted suicide (PAS), end-of-life care, ethics, ethical dilemma, social work practice, bioethics.

**COVID-19 pandemic opportunities for development of herbal alternatives for sustainable health**

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**Abstract**

This paper addresses the critical importance of herbal medicine, hygiene standards for immediate responses to COVID-19 outbreaks and provides policy recommendations for more sustainable health alternatives. Conventional medicine approaches such as pharmacotherapy with many different drug medicines and biologics have been utilized across the world but still posing a

challenge to the pandemic. Today traditional and alternatives/complimentary medicines are gaining popularity as mainstream therapies in many countries as these medicines are employed in a variety of health care settings and as home remedies. Despite their extensive use, safety, efficacy, quality, access and rational use of these form of health care are still major issues of concern. While current research focuses on the likely efficacy of herbal medicines to support health care, there is a lack of attention to ensuring the sustainability of supply chains, providing the herbal ingredients, in particular those sourced from the wild. We recommend that policy and decision makers in respective countries at all levels need to: integrate explicit health nutritional requirements in pandemic response plans, ensure full exploitation of plant parts identified for medicinal purposes including sufficient training to ensure high hygienic and safety standards; recognize the importance of protecting and promoting the safety of all herbal professionals, and non-professionals (traditional herbalists), and that limited resources lead to priority setting and unequitable access to such medication. There is need to ensure adequate supervisory structures and operating procedures are in place to ensure inclusive care of high quality; react with solidarity to support regions and countries requiring more surge capacity, and acknowledge the need for transparent, flexible and situational leadership styles building on a different set of public health interventions that apply community based prevention programs.

**Key words**

COVID-19, Herbal Alternatives, Sustainable Health

**Psychological Factors Influencing Men's Participation in Family  
planning Practices in Kakamega County, Kenya**

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**Abstract**

Family planning has attracted attention all over the world due to its relevance in decision making, population growth and development. The purpose of this paper is to investigate the psychological factors influencing men's participation in family planning practices in Kakamega County, Kenya. This study adopted cross-sectional survey design using mixed methodology. The study targeted 17469 household heads in Likuyani, Malava and Lugari Sub-Counties. Sample size determination formula was used to obtain 376 respondents. Stratified, simple random, purposive and systematic random sampling techniques were used to select the participants. Questionnaires, interviews and document

analysis were used to collect data. Instrument validity was done through expert judgement while reliability involved the use of test-retest method. Data obtained was analyzed using quantitative and qualitative techniques. Frequencies and percentages were used to analyze quantitative data. Pearson Correlation Coefficient was employed to determine the relationship that exists between the independent variables and dependent variables. Qualitative data from interview schedules were transcribed, thematically classified and arranged before they were reported in narrations and quotations. The study found a significant negative correlation between psychological factors and men's participation in family planning in Kakamega County ( $r = -.286$ ;  $p = .000$ ). This shows that psychological factors affect men's participation in family planning practices in Kakamega county. The study recommended that promotion and sensitization campaigns on various family planning methods and their advantages mainly targeting men need to be undertaken in the region by the national government, county government and non-state actors. This study may be of importance to couples in understanding the psychological factors that hinder men in participating in participating in family planning practices. In addition, by understanding the psychological factors affecting family planning, the government and other healthcare partners in Kenya may use the findings in providing health education on family planning.

**Key words**

Psychological Factors, Influencing, Men, Participation Family planning

**The role of TVET in creating innovative response during and after the COVID-19 era**

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**Abstract**

The Government of Kenya has made tremendous efforts to help young people get relevant skills that would enable them fit well in the labour market. There has been construction of Technical Institutions in almost all the constituencies in Kenya, equipping of these institutions with the needed facilities and resources and providing capitation for each learner. Despite the efforts made by the government, a good number of youths still don't have the skills needed in the job market. The situation has been worsened by the crisis caused by the COVID-19 pandemic. We therefore need to re-model the way things are done. Young people need to be involved for them to mobilize and take charge of the situation. It is expected that there is proper coordination between different agencies for purposes of better communication and dissemination of

information. However, there is always a disconnect between the various programmes offered by the government and the beneficiaries due to lack of proper communication. This paper therefore aims at bridging the gap between the existing programmes and these beneficiaries. There is need to ensure that information is disseminated at the grass root level either digitally or through guided protocols by the Ministry of health. TVET can play a vital role in coming up with innovative responses and other strategies during and after the COVID-19 era. One way of doing this is for TVET institutions to introduce contactless procedures that can be used to register trainers, capture visitors details, keep attendance among other modes. TVET can also engage the trainers by assigning them responsibility of identifying and reaching out to youths with different skills in their locality and helping them to improve those skills through the use of modern machines which are available in most TVET institutions. The youths should learn to create apps and design websites for purposes of scanning documents, imparting knowledge and skills needed, so as to reduce physical contacts. Trainees should also develop skills that can help in the production of quality masks, hand washing machines, ICU or ordinary beds for hospitals and food stuff with nutritional values. TVET institutions can also increase internet connectivity to allow trainees to scan notice boards; employ mentorship and training mechanism that can help them acquire the needed skills among others. The main objectives of this research are: to identify the challenges faced by TVET institutions as a result of COVID-19 pandemic; to highlight different strategies TVET institutions can employ to minimize the challenges faced by young people during COVID-19 pandemic and to establish the various skills that could be acquired during the COVID-19 era. The study will employ Participatory Communication Model and it will use descriptive research design. Data will be collected through interview schedule and analyzed qualitatively.

### **Financial impact of COVID-19 crisis on investor income: A case of investors in real estate in Kisii County**

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#### **Abstract**

Investors like other economic players were hard hit by COVID 19 protocols such as travel restrictions, lockdowns, curfew and mass relaxation and withdrawals of many players from security exchanges. Particularly income for investors in real estate dropped significantly by a margin of 40% due to the

effects of these measures. The ravaging effects of the pandemic saw many people losing jobs especially in the service industry such as tourism, hospitality, transport, professional consultancies and even in manufacturing sector. A survey was conducted in Kisii Town for the period March 2020 to December 2020 and a sample size of 100 large scale investors in the town was used. The responses in the structured questionnaires were tabulated for further analysis. Data was analyzed using descriptive statistical methods of minimum, maximum, mean and standard deviation. Correlation and regression analysis tools were also adopted to measure the effect of the interruptions on the **investor** income. The survey did affirm that most tenants were unable to pay rent during the lockdown and curfew times and this forced them to move to rural settings where they did not pay any rent. Some of the tenants who persisted were able to pay 50% of the initial rent while others paid at least 3 months later. In effect rental income for investor diminished as the lockdown and curfew period persisted. It is recommended that alternative investment options such as trading in shares, bonds, unit trusts and agribusiness should be explored by real estate investors to diversify risk and cushion themselves against such eventualities as is espoused in Capital Asset Pricing Model.

### **Determining the impacts of covid-19 in Kenya**

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#### **Abstract**

The COVID-19 pandemic has affected Kenya's economy in several ways. They include contraction of the economy, productivity losses, and social welfare losses. The preliminary data so far indicates that Kenya's economy will contract in 2020 by -0.3%. However, the contraction could be as high as five per cent. The contraction rivals the contraction of 1992. Over the 30 years, the years 1992, 2008, and 2020 will be the most difficult in recent Kenya's history. They should take a more targeted approach. Policymakers should devise specific social welfare infrastructure that can target the population already rendered vulnerable by the Pandemic. The topmost priority now is to deal with the public health crisis; which is suppressing the infections

#### **Key words**

COVID-19, Economic Contraction, Social Welfare losses, Electricity, Productivity

## Ways of reducing challenges of sexual abuse in kenya

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### **Abstract**

This research paper discusses the social and legal aspects of child sexual abuse in Kenya this research paper also discusses the main challenges of child sexual abuse in Kenya. Two significant contributors namely poverty and patriarchy are considered against a background of a paucity of information. The main problem to be confirmed and discussed is a comparative analysis is made between certain developed and developing countries. The legal aspects of child sexual abuse in south Africa are discussed and the relevant legislative provision are evaluated and criticized in terms of their progressiveness. The main objectives of this study to reduce effects of child sexual abuse in Kenya where most children should be empowered to sexual abuse, to enhance education and learning to most our children, and to eradicate all forms of child sexual abuse in Kenya and lastly to come up with ways of how people will be informed on challenges of child sexual abuse. The main methods used were; Questionnaires and oral interviews whereby some parents were being asked if they were aware and most of them were responding that they were aware but they did not know how to handle the situations since they were affected on how their children conditions were. Questionnaires were used also to some of the children and parents where they also gave out most of the challenges that their children lost self-esteem. This research paper further discusses the pitfalls of the lack of medical evidence i. e establishing child sexual abuse and how this impact on the prosecution of offenders. This paper concludes with recommendations and findings such as mitigate sexual violence against children with particular emphasis on prevention, where concerted efforts are required from both government and society in particular the government to come up with more several policies on how people who sexually abuse children should be punished and how parents and children should be educated on ways to handle sexually abused children.



**TVET opportunities and challenges and its effect on TVET transformation, A case study of Eldoret National Polytechnic Uasin Gishu County Kenya**

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**Abstract**

Technical and Vocational Training is a major player in development of knowledge and skills necessary for National Development. The Ministry of Education, Science and technology enacted a myriad of reforms geared towards realizing adequate human resources for the economy. Despite this, there are inherent challenges arising from the reforms undertaken. This study sought to establish the impact of some of the reforms undertaken beginning with the enactment of the Technical and Vocational Education and Training (TVET) Act 2013. The specific objectives of the study were to find out whether the government capitation, transfer of teachers from Teacher Service Commission (TSC) to the Ministry of Education (MOE), provision of adequate equipment, collaboration with the industry has led to the growth of the sector. The study also sought to establish whether Competency Based Education and Training (CBET) programs as has solved unemployability problem in Kenya. The research was grounded in the theory of experiential learning and philosophically oriented to pragmatism, which postulates for learning by doing and application of creative ideas to productive use instead of passive learning. The study was a case study targeting Head of departments (HODs) from the Eldoret National polytechnic, Eldoret Kenya. The adopted descriptive survey research design. The study targeted the HODs and their deputies drawn from all the 11 departments academic departments at The Eldoret National Polytechnic (TENP). A sample size of 19 respondents were selected for the study, who comprised 9 HODs and 10 deputy HODs. The study purposively selected 3 head of departments whose departments are deemed to be entirely technical. Questionnaires and interview schedules were used for the study. Reliability of the questionnaire was tested after piloting. Data was analyzed with the aid of SPSS ver. 27 and statistics used included frequencies, percentages and means. Presentation was made using tables and charts. The study results indicated that most HODs 17(94.4%) were affirmative that enactment of TVET Act and government capitation (100.0%) has led to improvement in the TVET sector. However, equipment for training is still is a challenge in some training programs, as alluded by 11(57.9%) of the HODs. Further the HODs expressed 7(36.8%) dissatisfaction and indicated that the transfer of teachers from teacher service (TSC) has demotivated the workforce. In addition, the study indicated that, there was inadequate collaboration with the industry in the training

14(73.7%). The study recommended a refocus on implementation of CBET programs and aligning training strategies to availability of training equipment.

**Key words**

Reforms, Teacher Transfer, Capitation, Competency Based Education and Training (CBET), TVET Transformation.

**HOSPITALITY**

**AND**

**NUTRITION**

### **Watermelon rinds jam**

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#### **Abstract**

The innovation entails the use of watermelon rinds in production of jam with the purpose of meeting micro-nutrient needs in processed food products and reducing disposal of watermelon rinds. Most of the processed food products have low quantity of micro-nutrient and made from expensive raw materials with a complex industrial procedure the aim of this innovation is to make micro-nutrient easily available in processed food and ensure appropriate and profit making method of waste disposal. This innovation is beneficial to all age groups especially people in marginalized area where there where the unavailability of micro-nutrients this is also important for hospitality industry as it can be embraced as a profit making method of waste disposal. An experimental research design was used by chopping the rinds then blending and later boiling in sugar. The jam was to have a thick consistency and a sweet vanilla test which was found acceptable among test subjects.

#### **Key words**

Jam, watermelon, rinds, micronutrients, wastes disposal

### **Role of online training on service delivery of waiters in licensed hotels in Nairobi County**

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#### **Abstract**

There are challenges facing waiters in hotel industry which require training for them to get skills for service delivery in their daily activities. During COVID19 pandemic period people are not allowed to have physical contact with one another and waiters are no exception. People started working at home and even others laid off, this called for online training needs for various organizations including hotel industry. There is limited literature about the online training done purposely for waiters, making it an area which required prompt study to get the solution. The study will focus on online training and service delivery to Waiters. Consequently it purposes to model the Role of online training on

Service Delivery of Waiters in licensed hotels in Nairobi County. Subsequently there are four objectives which were estimated to be achieved at the end of the study as follows; first was to identify the role of online training on service delivery by waiters in licensed hotels in Nairobi City County, secondly was to evaluate the level of competency of waiters on service delivery in licensed hotels in Nairobi City County, thirdly was to model service delivery of waiters out of online training for decision making and finally was to recommend about the needs for online training to service delivery of Hospitality service providers which are waiters. Subsequently the research methods will be convergent parallel design which entails that the researcher concurrently conducted the quantitative and qualitative approach of research methodology at the same time. There were 71 hotels which were targeted besides estimated target population of 1300 waiters and 300 supervisors besides, out the total population there were 242 sampled. The data were collected by sending online semi structures questionnaires through filled Google forms to Hotel administrators to share with waiters and supervisors within a period of one month during corona season, other waiters who were known by the researcher and assistants were send the filled Google forms to their own gmail accounts. IBM SPSS software version 21 was used to clean, edit, present and analyze data besides excel. The variables were tested using t-test and Analysis of Variance for the descriptive and inferential data which were presented using tables, simple as well as multiple regression models will be used for analysis accordingly. The study is significance to the Human Resources in Hotel set up, Hotel operators and policy makers.

**Key words**

Online training, service delivery, competence

**Influence of ICT on skill development in technical and vocational training institutions in Kenya: A case of western region**

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**Abstract**

Information and Communication Technology (ICT) has become an effective element of skill transformation in the education sector. As globalization and competitive advantage grows, the capacity of training and learning in the 21st century become pervasive, more specialized and demand driven. This brings enormous gap between trainers and students in terms of knowledge and skill acquisition. Despite the significance of ICT on training, the Sub-Saharan Africa

is overwhelmed by total challenges on adequacy of skills necessary for integration and implementation of e-learning. Unfortunately, such shortfall has an overall impact on skill development both at individual, societal and national level. Therefore, this paper investigated the influence of ICT on skill development in TVET institutions in Western Kenya. The study applied Upper Echelon Theory. The study targeted trainers in 52 Hospitality departments. A descriptive method was used with sample size of 350 trainers. Data was analysed descriptively. Findings show significant effect of ICT on training experiences, awareness and perceptions towards skill development. Equally noted, strategic decisions on technology lacked significant support from top managements from these institutions. The findings are relevant to Government and TVET institutions on urgent need to upskill trainers in ICT application and use on training least they become obsolete in skill capacity and development.

**Key words**

ICT, skill development, TVET institutions

**Food security in West Pokot County, Kenya: The traditional coping strategies towards food shortage in the semi-arid area**

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**Abstract**

The Pokot people have adopted various traditional and external measures for survival, since the West Pokot County is a semi-arid region. In spite of the interventions, there is persistent food crisis in the area. It is in the light of this problem that this study focused on examining the traditional coping strategies with regard to food shortage. The traditional strategies included: rationing of food consumption, migration, raiding, acquiring grazing land, and store as well as preserve food, sell of animals, rainmakers, and wild fruits. External sources mainly came from NGOs and the Government to supplement the economy of households. This entails the provision of relief food as well as medicine for the community, school fees, and boreholes. The objective of the study is to examine the coping strategies of the Pokot households towards food shortage. A survey of 140 households was done and data analyzed using descriptive statistics. The findings showed that the majority of households practiced both traditional and external measures for survival compared to those who depended only on indigenous resources. Finally, the results showed that most households turned to relief food especially during drought. The culmination of this objective lead to a number of recommendations: the response towards food

insecurity is a combination of both indigenous and external measures in source and practice; use of new acceptable modern technology for the provision and improvement of irrigation, get rid of traditional practices that are unproductive for food security. There is also need to build more dams and boreholes to provide adequate water for the people and their livestock.

**Key words**

Food Security, Survival/ coping Strategies, Indigenous/Traditional, External measures, technology

**Environmental sustainability in the hospitality industry**

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**Abstract**

The hospitality industry is faced by continuous environmental threats though not well explained generally. With the continuous environmental degradation on the physical world, the hospitality industry needs to up its game to save the environment. Sustainability in hotels involves reducing environmental impact through green-based methods in service delivery, logistics, maintenance and supplies. The core function revolves around saving energy, cutting down on water usage and reducing waste. There are many steps a hotel can take to ensure environmental sustainability is achieved, such as using alternative sources of energy such as solar and wind power for heating water, proper waste management systems with recycling options well in place and also reduction of food wastes through correct and appropriate portion control systems. The study is guided by objectives such as; identifying the environmental sustainable methods already installed in hotels, it is also objected to understand the importance of environmental sustainability in the hospitality industry and finally to understand the impact of environmental sustainability in the hospitality industry. The study is descriptive based on improvement of previous literature, achieved majorly through observations on various hotels but not limited to also interview questions. The study is based on hospitality outlets within Eldoret town with further research set to be rolled out to the rest of the country in due time. The research will shade light to the environmental sustainability methods used by hotels and other hospitality outlets in their industry. In addition to that, the research will also help improve on environmental sustainability methods to various and other hotels and hospitality outlets. Finally the research will help other researchers who seek to add more information about the same matter in the future.

### **Use of amaranth flour in pasta fortification**

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#### **Abstract**

Pastas are widely used in the world as a both convenient food and food that need little preparation at home however most of the pastas are made from gluten flour which supplies nutrient in the macro-nutrient form the purpose of this paper is to bring out the health benefits of amaranth enriched pastas. Non enriched pastas may not meet the micro-nutrient need in most ages whom they use pastas as witnessed most people used to pastas are the young adults whom they require micronutrients due to their growth and development. The paper aims to address the use of micronutrient rich products in fortification of convenient foods and improve the convenient food quality in the market. The paper will significantly address major challenges faced by adolescents and even increase the acceptability of pastas among the old people. The paper uses experimental design method of research by following keenly rations of flour mixture to come up the desired products. The finding of from the research was the end product could be rolled to the desired shape and more likely the same as the normal pastas with the difference in nutrient composition.

#### **Key words**

Pasta, micronutrient, fortification, convenient food, macro-nutrient

### **Contemporary innovations in food waste management in commercial foodservice outlets in Kenya**

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#### **Abstract**

Food waste is one of the biggest concerns in commercial foodservice outlets because a significant amount of food produced is never consumed. In commercial foodservice, food can go to waste at various levels during acquisition, storage, preparation, cooking, serving, and after serving. There is increasing evidence that majority of waste that goes to landfills is food waste and when food goes to landfills, it decomposes without access to oxygen and



produces methane gas which is a potent greenhouse gas that destroys the planet and contributes to climate change. Not only are resources throughout the value chain that are put in production of uneaten food wasted but also of concern is the high level of starvation and food insecurity present in Kenya. The severity of food waste is therefore economically, morally and environmentally catastrophic. The purpose of this study was to examine the contemporary innovations in food waste management in commercial food outlets. The specific objective was to determine the impact of contemporary innovations in food waste management on commercial foodservice outlets. The study adopted documentary analysis research design where a systematic procedure was used to review previous literature materials. The findings from the study indicate that contemporary innovations have a positive impact by offering sustainable food waste management solutions which help reduce the amount of food from commercial food outlets that goes to landfills. Commercial foodservice outlets are therefore required to embrace innovations aimed towards reducing the amount of food waste in their daily operations.

**Key words**

Food waste, Contemporary innovations, Food outlets, Commercial foodservice, Food

**Influence of Millennial employees abilities on their work performance in selected hotels, Eldoret Town, Kenya**

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**Abstract**

Millennials represent a large number of workforce who are young in age, new in the job market, and ambitious in their goals. They provide a larger workforce within the hospitality industry which makes it imperative for the human resource management to consider them. Their behaviors in the workplace makes them distinct from other old or existing employees. Reports have emerged that conflicts, dislike of work, lack of responsibility and interest is characterized among these type of employees. This is a characteristics and explanation is fully outlined by Mc Gregory's theory X and Y. Therefore, it is imperative that millennials can affect work productivity and performance if the organization does not plan for them. It is from this justification that the study did seek to establish the Influence of Millennial employee's abilities on their work performance in selected hotels, Eldoret. The study employed a descriptive survey design where 12 hotels selected purposively from Eldoret Town based

or rating formed the unit of study. Top and middle level employees were then selected from these hotels and were given questionnaires to fill. Percentages, mean, frequencies (Descriptive statistics) were used to analyze the data which were presented using frequency distribution tables. The study established that majority of the Millennials employees had the ability to perform work in the selected hotels. The findings further showed that they have ability to take more work compared to the older generation employees and thus improve job productivity. The study showed that employees requested motivations, incentives and more responsibility to increase their ability to perform well at the work place. The study recommends that the hotel management should employ human resource strategies that enhance ability of the employee to form exceptionally.

**Key words**

Millennial, Job performance, employees, abilities, employment