



Association of Consulting Engineers of Kenya

ACEK 20 CONFERENCE 23

Engineering Food Security

Sirikwa Hotel
Eldoret, Kenya
16th - 18th October 2023

CONFERENCE MAGAZINE



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Eng. Patrick Simiyu Wambulwa,
CE, MACEK, FIEK

Chairman's Welcoming Note

Distinguished guests, ladies and gentlemen, all protocols observed.

It gives me great pleasure to welcome you to the 2nd ACEK Annual Conference, hosted in the beautiful City of Eldoret – 'The Home of Champions', a venue fitting for our discussions, given the region's significant contributions to our nation's agricultural sector. Your attendance is confirmation of the good choice about the Conference venue. Indeed, we are in a good place and with good people.

Our Conference theme, 'Engineering Food Security' resonates with most of the stakeholders as signified by your presence here, as well as the venue of the Conference. It is noteworthy that our conference commences on World Food Day, the 16th of October, a day dedicated to advancing food security globally.

The United Nations Food and Agricultural Organization (FAO) published a report in October 2022. The report, titled "The State of Food Security and Nutrition in the World 2022" estimated that about 900 million (11%) people in the world experienced severe food insecurity in 2022 while 2.4 billion (30%) experienced moderate to severe food insecurity. In the same year about 342 million (23%) people in the African Continent experienced severe food insecurity, while 868 million (60%) people experienced moderate or severe food insecurity, as illustrated in figure 1 below. This implies that the African continent, with vast arable land, is the most food insecure continent in the world.

Conflict, climate extremes, economic slowdowns and downturns, and growing inequalities are the major drivers of food insecurity and malnutrition, often occurring in combination and challenge efforts to achieve the SDGs on food security. The recent COVID-19 pandemic, war in Ukraine, and related soaring prices of food, agricultural inputs and energy have not made it easier to achieve the SDGs either.

The aspiration for food security and nutrition is expressed not only in the United Nations Sustainable Development Goal Number 2 – which envisages a world without hunger, but in other continental, regional, national, and local policies, strategies, and plans, which include:

- Africa Agenda 2063,
- The African Development Bank Feed Africa Strategy,
- East African Community Vision 2050,
- Kenya Vision 2030,
- The Bottom-Up Economic Transformation Agenda (BETA) by the Current Administration in Kenya,
- National policies and strategies on agriculture and food, and the
- County Integrated Development Plans (CIDPs)

Figure 1: The Concentration and Distribution of Food Insecurity by Severity Across the Regions of the World



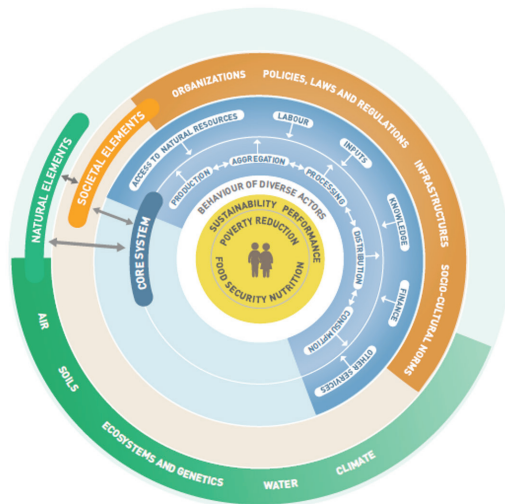
Source: FAO, 2023. Food Insecurity Prevalence. Accessed 12 July 2023. www.fao.org/faostat/en/#data/FS

Thinking Holistically

For efforts on food security to be successful, there is need to think, as well as holistically understand the structure of the food systems and what constitutes Sustainable Food Systems. Food Systems encompass the entire range of actors and their interlinked value adding activities involved in the production, aggregation, processing, distribution, consumption, and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic and natural environments in which they are embedded as illustrated in figure 2 below. It is worth mentioning that the food system is composed of subsystems (e.g., as farming system, input supply system) and interact with key systems (e.g., energy system, health system,).

Considering the escalating climate change challenges, engineering solutions for food security must also address resilience against erratic weather patterns, ensuring our food systems are robust against unforeseen climate threats.

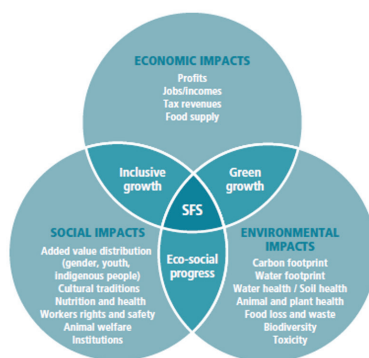
Figure 2: The Food System Structure or Wheel



Source: Hanh Nguyen, Sustainable Food Systems – Concept and framework, FAO 2018

A Sustainable Food System ensures food security and nutrition for everyone, balancing economic, social, and environmental considerations to safeguard the well-being of future generations (see figure 3 below).

Figure 3 Sustainable Food System



Source: Hanh Nguyen, Sustainable Food Systems – Concept and framework, FAO 2018

In keeping with our theme, engineering food security, our discussions over the next two days will explore the sustainable food value chain (production, aggregation, processing, distribution, consumption, and disposal of food products) in a holistic way. Specifically, we will highlight the integral roles and potential contributions of engineers in the entire food value chain. As you are aware, engineers are involved in every step of the food value chain – through design, manufacture, maintenance and operation of machinery and equipment production, aggregation, processing, and distribution of food as well as the infrastructure like irrigation, transportation and energy supply that support the food value chain. We may also

consider exploring whether as a country we are ready to for the benefits of creating space for Food Engineering as a discipline of engineering, distinct from food processing and food science. The Tea Machinery Engineering Company Limited (TEMEC), a subsidiary owned by KTDA Holding Ltd, is an example of a food engineering company operating in Kenya.

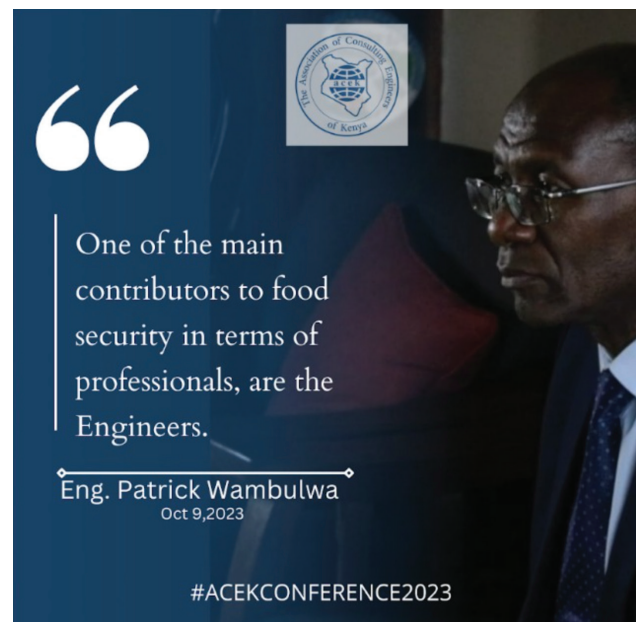
Over and above, moving towards affordable, sufficient, safe and nutritious food, we anticipate our discussions will highlight profitable business opportunities, leading to increased jobs and incomes. That will, in turn, contribute to increased government revenue.

Given the global emphasis on green solutions, the potential for inclusive growth and environmental sustainability, will also be touched on. The scheduled study tours promise to be enlightening, offering practical insights into our discussions.

As we proceed, I'd like to extend my gratitude to our Sponsors, Partners, ACEK Members, Conference Organizers, the ACEK Secretariat, who've made this event possible.

In conclusion and echoing the sentiments of years in this profession, I've seen the transformative role engineering plays in food security. Together, let's harness this potential, innovate, collaborate, and truly engineer a future where everyone has access to nutritious food.

Thank you, I welcome you to our 2nd Annual ACEK Conference I hope you find our discussions over the next two days insightful.





Eng. Jane Mutulili, CE, FIEK, MACEK

Honorary Secretary's Message

The Association of Consulting Engineers of Kenya (ACEK) is a membership organization which was founded in 1968 and whose main objective is to promote the advancement of professionalism within the Consulting Engineering industry.

ACEK has a current membership of 108, 95-member firms and 234 Future Leaders. The members and member firms are drawn from the consulting engineers and consulting engineering firms registered by Engineers Board of Kenya (EBK). All the full members are also corporate members of the Institution of Engineers of Kenya. We note and appreciate that not all consulting engineers are members of the Association and it is our singular duty to entice those not already in the fold to join us, not by words but by deeds. We look for to continue increasing in numbers as this is what gives us the synergy to grow the critical mass to offer improved services to our country. To all our new and potential members, karibuni sana.

I wish to applaud the ACEK Future Leaders, who are the young generation of engineers, who have raised the visibility of ACEK to new heights; with a lot of vibrancy and engagement and community service, and indeed ensures that ACEK lives on. Future leaders' membership is drawn from young engineers, under the age of 40, both registered and unregistered by EBK. They not only work in the member firms, but also in other institutions and agencies offering engineering services. (I will allow the chair Future Leaders a few minutes to tell us more of who they are and their programmes).

This is our second ACEK conference and we intend to make this an annual event which will be providing a forum for Engineers, researchers, practitioners, and other stakeholders to discuss, evaluate and devise ways of maximizing the benefits of engineering for comfort and prosperity of mankind.

Our theme for the conference is "Engineering Food Security". Food security is not just about having enough food on our tables, but can be described as

the sustainable state of having reliable access to a sufficient quantity of affordable, nutritious food. We are convinced that engineers have a place on the table to make this a reality and this conference will discuss how this can be achieved. This is extensively covered in the following sub-themes:-

- Infrastructure, Roads, Transport, Rural Housing, Communication and ICT
- Irrigation and Water Resources
- Machinery and Mechanization
- Energy
- Economics, Marketing and Finance
- Manufacturing and Agro-Industries
- Environment, Climate Change and Urban Agriculture
- Education, Research, Practice and Emerging Technologies

Each of these themes is well covered in the plenary, keynote addresses and papers presented during the breakaway sessions. There are other cross cutting issues to be discussed during plenary sessions.

I would like to thank and appreciate, in a very special way, the conference committee that has organized this conference and the paper committee that sourced, vetted and put all the papers together for presentation. In a special way I thank all the paper presenters and panel discussants who have put time aside to prepare for presentation in this conference. We do not take that for granted. In a special way I wish to also recognize and thank all those who supported the conference, either in sponsorship or delegates or whatever other contributions they made, in cash or kind, thoughts or deeds. Allow me to mention three outstanding corporates, our main sponsor, Kenya Rural Roads Authority, KeRRA who have graciously sponsored us as the main sponsor, Engineers Board of Kenya, EBK, who has sent us the most delegates and KenGen, who were the first to confirm their

delegates, and have sent the most virtual delegates. I thank you all so much.

I also wish to appreciate our partners, the county of Uasin Gishu, not only for hosting us and allowing us to be in their county, but you will notice that they have the most presenters from a single organization. This land of champions has very many engineers at the helm and therefore we do feel very welcome to work with them.

There are value enriching exhibition booths that you have all been invited to visit at any point during your breaks to engage with the presenters. A list of the exhibitors is in your e-programme and in the note books inside your bags. The bags have graciously been donated by Apex Steel and Apex Piping. At the end of the first day, we shall have a cocktail where we shall hear more from our sponsors. After the closing ceremony tomorrow, we shall have a gala dinner and more of our sponsors will let us know what they do.

On the third day of the conference, you are all invited to attend the various site visits. These site visits have carefully been chosen to ensure that everyone is well taken care of. They include: -

- Buffalo Millers
- Chebut Tea Factory (KTDA)
- Unga Millers
- Coca Cola Eldoret Plant
- KCC
- North Rift Water Works Development Authority (Chebara Dam Treatment Works, Eldoret Sewerage & Sewage Treatment Works and Kipkaren Dam)
- Alten Kenya Solar Farms
- Rivatex
- Self-Directed Tour of the City

You are all encouraged to fill in the forms to indicate which site(s) you will visit for logistic reasons. It is very important that you visit a site for the conference to enjoy the conference in full. On the third day, the exhibition booths will be open to every one within the county.

Finally, on behalf of the Association of Consulting Engineer of Kenya, ACEK, Council members and the organizing committee of this conference, and no doubt the leadership and residents of Uasin Gishu County, we are delighted to welcome all delegates and visitors to the wonderful city of Eldoret for the second Annual ACEK Conference. I say "City" sparingly because the process is still on-going but we all look forward to having our 4th City in Kenya.

(Allow me now to invite the chair of Future Leaders to say a few words, very few words)





**Eng. Gabriel W. Jabongo, CE, FIEK,
MACEK**

Honorary Treasurer's Message

Food security is a situation where everyone has physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle. When it comes to the issue of food security, it is important because more than one-third of the population is poor and children are malnourished according to some statistics. Kenya has varying climatic and economic conditions all over the country. Therefore, the matter of food security has to be taken into account properly and with adequate plan. There are four main dimensions of food security: Availability, Access, utilization, and stability.

Engineers play a key role in food security directly from manufacturing of Agricultural implements, development of good infrastructure, storage silos, transportation, food manufacturing, provision of water through dams, piped water, just to name a few.

In this conference, we anticipate exploring several ways engineers contribute to food security.

At the end of the conference participants will be enlightened on all the processes that contribute to food security.

Just in case you miss some presentations don't be discouraged as we will produce this conference proceedings which can be referred to at various times. The proceedings will be accessed free of charge from our website www.acek.co.ke.

“



Engineering food security is an ongoing exercise which cannot come to an end. So we keep on discussing. We keep on inventing. We keep on bringing new technology into the field

Eng. Gabriel W. Jabongo

14 OCT, 2023

#ACEKCONFERENCE2023



Eng. Barbara Adhoch, PE, MIEK,
MACEK(FL)

Message from the ACEK CEO's Office

It has been a year since we had our last Conference and we have seen elevated vibrancy in the affairs, functions, and activities of the Association of Consulting Engineers in Kenya. The Association continues to gain visibility as has been demonstrated by the enthusiasm from our membership, partners, and Future Leaders. Our social media platforms continue to grow in visibility and content dissemination.

The 2nd ACEK Conference gives me great pleasure and honor to interact with you once again at both membership level and stakeholder with a view to sharing knowledge and gaining insights in a thematic area that is more than relevant in our calendar time. The choice of the venue resonates well as it will provide us with the ambience and the environment within which we can directly interface with all the key parameters that are required in the food value chain.

On behalf of the staff of ACEK, I am delighted to welcome you all to this 2nd Annual ACEK Conference. Let us make this event a memorable and transformative experience. I also extend my gratitude to all the stakeholders, to all the sponsors and our partners who have contributed in a valuable way towards making this event a success.

Wishing you an inspiring and productive conference

Karibuni!



**John Robert Otieno Ogallo, GE, GMEIK,
MACECK (FL), Chairman FL**

Message from the ACEK FL Chairman

I would like to express my heartfelt gratitude to all the members of ACEK for their unwavering commitment and dedication to the engineering profession. Your expertise and passion have played a pivotal role in shaping the infrastructure landscape of our great nation.

As future leaders, we carry a significant responsibility to drive innovation, foster sustainable development, and address the evolving challenges that our society faces. This upcoming conference provides an ideal platform for us to come together, exchange ideas, and chart a course for the future of our profession.

The second ACEK conference themed “Engineering Food Security” is relevant to us as experts in a world grappling with significant challenges such as population growth, climate change, and limited resources, it is imperative that we, as engineers, step up and contribute to finding sustainable solutions to ensure food security for present and future generations. We aim to create an environment that encourages open dialogue, knowledge sharing, and networking opportunities. We have invited renowned experts from various engineering disciplines to deliver insightful presentations and engage in panel discussions. Their expertise and experiences will undoubtedly inspire and equip us with the tools necessary to overcome future challenges.

I encourage all the participants, especially the future leaders amongst us, to actively engage in the conference

proceedings. Take advantage of the opportunity to present your research, projects, and ideas. Together, let us shape the destiny of engineering and contribute towards the betterment of our society.





**John Jairo - Secretary, GE, GMEIK,
MACECK (FL), Secretary FL**

Message from the ACEK FL Secretary

Dear Esteemed Members and Conference Participants,

It is with great pleasure that I extend my warmest welcome to all of you to the 2nd annual Association of Consulting Engineers of Kenya Conference.

This year, our conference theme is “Engineering Food Security,” a topic of utmost relevance in our ever-changing world. As the next generation of Consulting Engineers, we have a critical role to play in addressing the challenges and opportunities presented by this theme. Food security is not only a fundamental human right but also a critical factor in the sustainable development of our nation and the continent.

Our conference will provide a platform for us to engage in thought-provoking discussions, share innovative ideas, and explore the most effective ways to contribute to the achievement of food security. With the backdrop of Eldoret, a region renowned for its agricultural prowess, we have a unique opportunity to witness and learn from practical examples of engineering solutions that have a direct impact on food production and distribution.

Throughout the event, you can look forward to:

- **Inspiring Keynote Speakers:** We have gathered a line-up of renowned experts in the field of food security and engineering, who will share their insights and experiences.

- **Engaging Panel Discussions:** Our panels will delve deep into various aspects of engineering's role in ensuring food security, from sustainable agriculture practices to efficient supply chain management.
- **Interactive Workshops:** These sessions will equip you with practical skills and knowledge that you can apply to your projects and initiatives.
- **Networking Opportunities:** Connect with like-minded professionals and establish meaningful collaborations that can shape the future of our industry.

This conference is not only an opportunity for personal and professional growth but also a chance to strengthen our bonds as future leaders in the field of consulting engineering. It is the collective effort and collaboration of dedicated professionals like you that will drive the positive change we seek in our society.

I urge you to make the most of this conference by actively participating in sessions, sharing your insights, and embracing the spirit of collaboration. Together, we can contribute to a future where food security is not just an aspiration but a reality.



Association of Consulting Engineers of Kenya
ACEK 2023
CONFERENCE
 Engineering Food Security

Sirikwa Hotel, Eldoret, Kenya
 16th - 18th October



Kenya Rural Roads Authority



Kenya National Highways Authority
 Quality Highways. Better Connections



Engineering Food Security

Background

Kenya has a growing population and is heavily reliant on agriculture. The World Bank's report, "**Kenya: Food Security Update, February 2023**," estimates that **4.3 million Kenyans are food insecure**. Several factors such as climate change, poverty, inequality, poor infrastructure, limited resources and evolving agricultural practices pose significant challenges to achieving food security.

Food security is central item in key sectors of Kenya's vision 2030 as captured by the sub items which are Agricultural related under the Economic Pillar. Strategies outlined in the development blue print of the Economic pillar include; increasing agricultural productivity, improving infrastructure and reducing poverty, strategies that are closely aligned to the AU Agenda 2063 under

Aspiration 1, that calls for eradication of poverty and hunger by 2063. Goal 2 of the United Nation's SDGs is to eradicate hunger, achieve food security and improved nutrition and promote sustainable agriculture. In addition, Agriculture is one of the major sectors in Kenya Kwanza's Manifesto to improve quality of life by prioritizing eradication of hunger. Kenya Kwanza's Manifesto include investing in irrigation, improving infrastructure and reduction of poverty.

In recognizing the importance of engineering solutions towards



achieving food security, the Association of Consulting Engineers, Kenya (ACEK) will be holding its 2nd Annual Conference themed "**Engineering Food Security**". The Conference will take place in Eldoret, Kenya, on the dates running from 16th to 18th October, 2023. The three-day conference seeks to bring together Consulting Engineers, researchers, practitioners, and other stakeholders to discuss, evaluate and devise ways of maximizing the benefits of engineering towards alleviation of hunger in Kenya. The Conference has been scheduled to coincide with the World Food Day that is observed annually on 16th October.

The Association of Consulting Engineers of Kenya

The Association of Consulting Engineers of Kenya (ACEK) is a professional organization that was founded in 1968 to promote the advancement of consulting engineering in Kenya. ACEK's mission is to provide a forum for consulting engineers to come together and share knowledge, collaborate on projects, and advocate for the interests of the profession. ACEK also serves as a watchdog for the engineering industry, and it investigates and takes action on complaints of unethical or unprofessional conduct. It also acts as one of public watchdogs on engineering matters.



**The Association
of Consulting
Engineers of Kenya**



The 2023 ACEK Annual Conference on Engineering and Food Security

The relevance of the conference theme can be considered from the following fronts;

- A significant portion of Kenya's population is engaged in farming activities. Employing engineering interventions can result to increased agricultural productivity, improved resource management and enhanced food security.
- The Conference would provide a platform to highlight local innovations, with availability of rich history of innovative agricultural practices in the Country. Showcasing successful engineering interventions and local innovations that have improved food security inspires replication of effective solutions across the Country.
- Emphasis on role of engineering in developing and implementing sustainable agriculture techniques. Through engineering solutions, we are able to promote sustainable farming practices, efficient resource management and prudent environmental stewardship.
- Developing of climate resilient agricultural systems requires engineering interventions. It is necessary to explore the avenue as Kenya is vulnerable to the impacts of climate change, including erratic rainfall patterns, prolonged droughts, and increased pest infestations. The conference provides a platform to discuss and showcase engineering solutions that enhance resilience in the Country's agricultural sector
- Taking cognizance that food security requires collaboration among diverse stakeholders, the conference will facilitate networking, knowledge exchange and partnerships, collaborations that when fostered would enable leveraging of collective expertise and resources to develop and implement engineering solutions to food security.



The 2023 ACEK Annual Conference Objectives

- a) Explore innovative engineering approaches to enhance and improve food security in the Country,
- b) Highlight effective engineering initiatives and local agricultural advancements,
- c) Examine sustainable agricultural practices and resource management techniques,
- d) Highlight climate-resilient engineering solutions for Kenya's agricultural sector,
- e) Foster cooperation, partnership and collaboration among stakeholders.

Proposed Sub-themes



**Infrastructure,
Roads, Transport
and Rural Housing**



**Irrigation and
Water Resources**



**Machinery, Energy,
Mechanization,
Economics and Finance**



**Environment,
Climate Change and
Urban Agriculture**



**Education, Research,
Practice and Emerging
Technologies**



**Manufacturing and
Agro-industries**

Expected Outcomes



**Raising
awareness
of the role of
engineering in
addressing food
security challenges.**



**Identification and
adoption of innovative
engineering
solutions applicable
to Kenya's agricultural
sector.**



**Establishing a
forum for stakeholders
to share knowledge and
collaborate Development
of actionable
recommendations and
strategies to enhance
food security.**



**Publication
of conference
proceedings and
best practices for
engineering food
security.**

Conference Format

The Engineering Food Security Conference will consist of **plenary sessions, parallel technical sessions, panel discussions, and interactive workshops**. Experts, researchers, and practitioners will have the opportunity to present their work, share experiences, and engage in discussions on various aspects of engineering for food security. The conference will also include **field visits** to relevant agricultural projects in the region.



Logistics

Registration: Registration is ongoing **online** but the attendees will collect their badges at the conference desk upon arrival. Collection of the badges will be on **Sunday 15th October 2023 from 2pm at Sirikwa Hotel. Exhibitions to be set up on October 15th 2023**

Transportation: The conference venue is **Sirikwa Hotel**, which is located in **Eldoret town CBD** and is easily accessible by public transportation. Delegates travelling can liaise with ACEK secretariat to assist with transportation logistics. Parking is available at the venue

Accommodation: A list of recommended hotels will be availed to the delegates



For more information,
Contact ACEK Secretariat at
acek@acek.co.ke,
aceksecretariat@gmail.com
M: 0717191593 T: 0202249085



Kenya Rural Roads Authority



Kenya National Highways Authority
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ACEK Committees

1.0 EXECUTIVE COMMITTEE

1. Eng. Patrick S. Wambulwa – ACEK Chairman
2. Eng. Jane W. Mutulili – ACEK Honorary Secretary
3. Eng. Gabriel W. Jabongo – ACEK Honorary Treasurer

2.0 MEMBERSHIP AND HUMAN RESOURCE COMMITTEE (MHR)

1. Eng. Mike Ogola – MHR Committee Chair
2. Eng. Prof. Lawrence Gumbe- Member
3. Eng. Gedion O. Onyuka - Member
4. Eng. Timothy Musiomi – MHR Vice Chair
5. Dan Brian Munene (FL) - Member
6. Eng. George Abuto (FL) - Member
7. Eng. Barbara Adhoch – MHR Committee Secretary

3.0 POLICY, STANDARDS AND ETHICS COMMITTEE

1. Eng. Andrew Wahome – PSE Committee Chair
2. Dr. Eng. Matu Mwangi - Member
3. Eng. Alex Mbugua - Member
4. Eng. Kennedy Kiunga (FL) – PSE Vice Secretary
5. Eng. Dick Ndiewo - Member
6. Eng. George Njoroge - Member
7. Eng. Kenneth Amollo (FL) – PSE Vice Chair

4.0 CAPACITY BUILDING AND TRAINING COMMITTEE

1. Eng. Mungeria Kirimania- CBT Committee Chair
2. Eng. Ikundo Muhoro - Member
3. Eng. Hesbon Okari (FL) - CBT Committee Secretary
4. Eng. Kennedy Kiunga (FL) - Member
5. Eng. Alex Mbugua - Member
6. Eng. Moses Ochola – CBT Committee Vice Chair
7. Eng. Sam Mambo - Member

5.0 RESEARCH AND PUBLICATION COMMITTEE

1. Eng. Prof. Lawrence Gumbe – RP Committee Chair
2. Dr. S. Mumenya – Member
3. Eng. Paul Ochola – RP Committee Vice Chair
4. Eng. Nathan Yego (FL) - Member
5. Eng. Nelson Bosuben - Member
6. Eng. Paul Karekezi - Member
7. Eng. Barbara Akinyi Adhoch (FL) -Member
8. Eng. Lorena Simba (FL) – RP Committee Secretary
9. Eng. Paul Thuo (FL) – Member
10. Ivy Getanda (FL) – RP Vice Secretary

6.0 INVESTMENT COMMITTEE

1. Eng. Patrick Wambulwa – IC Committee Chair
2. Eng. Jane Mutulili - Member
3. Eng. Gabriel. Jabongo - Member
4. Eng. Solomon Kitema - Member
5. Dr. Eng. Johnston Matu - Member
6. Eng. Jonathan Mbui - Member
7. Eng. Sam Mambo - Member

7.0 FUNCTIONS AND EVENTS COMMITTEE

1. Eng. Jane Mutulili- FE Committee Chair
2. Eng. Dick Ndiewo – FE Committee Vice Chair
3. Eng. Kennedy Kiunga (FL) - Member
4. Eng. Gabriel Jabongo - Member
5. Eng. J. N. Mwangi - Member
6. Eng. Peter Wanday - Member
7. Eng. Prof. Lawrence Gumbe - Member
8. Eng. Patrick Wambulwa - Member
9. Eng. Gabriel Okumu - Member
10. Eng. Bernard S. Oloo - Member
11. Eng. Nathan Yego (FL) - Member
12. Eng. Lorena Simba (FL) - Member
13. Eng. Yvette Olende (FL) – FE Committee Secretary

ACEK Council Members



**Eng. Patrick Wambulwa - CE, FIEK ,
MACEK,
Chairman**

Eng. Wambulwa is the Chairman, Tertiary Consulting Engineers Ltd. He is a registered consulting engineer with Engineers Board of Kenya (EBK), a Corporate Member of Institute of Engineers Kenya (IEK), Full Member of the Kenya Institute of Management (KIM), Member of the Environment Institute of Kenya (EIK), Member of the Kenya Committee on Large Dams (KENCOLD), and a member Association of Consulting Engineers of Kenya (ACEK). Eng. Wambulwa has a wealth of experience and has undertaken consulting assignments in the field of civil engineering including Transportation and Roads, Water Supply, Sewerage/Sanitation, Irrigation, Storm Water Drainage, Solid Waste Management, Environmental Impact Assessment/Audit, and Structural Engineering Projects. Eng. Wambulwa is currently an honorary secretary to the Association of Consulting Engineers of Kenya. He holds a Bachelor of Science in Civil Engineering from the University of Nairobi and a Master of Science in Sanitary Engineering IHE Delft, the Netherlands.



**Eng. Jane Mutulili - CE, FIEK,
MACEK
Honorary Secretary**

Jane has over 24 years of experience working in the field of construction, project management, water & sanitation and community infrastructure. She is the owner of La Femme Engineering Services Ltd, which is currently managing projects in Kenya, Somalia and South Sudan, for various clients including United Nations Office in Nairobi, UNICEF, WFP, World Vision, IOM and the Somalia Stability Fund.

As an engineering leader, she is registered and qualified consulting engineer with the Engineer's Board of Kenya and a Fellow of the Institute of Engineers of Kenya, where she also served as the first vice president of the institution. She is a qualified water engineer practicing in Kenya and the Eastern Africa region, and has comprehensive experience in the practice of Engineering Consultancy. She is therefore able to integrate international design procedures with the needs of the local people, and offer systems that are compatible with the social economic environment of the people in the project area.

Jane has vast experience in program planning and management, monitoring and evaluation, and has an in-depth understanding of United Nations systems, including program cycle and reporting standards. She is energetic, motivated, and a team player and has served in various boards within the country. She is the owner of La Femme Engineering Services Ltd Nairobi, Kenya She is fluent in English and Kiswahili, has basic French skills, and speaks three other local dialects.



**Eng. Gabriel Jabongo -
CE, FIEK, MACEK
Honorary Treasurer**

Eng. G.W. Jabongo is a Registered Consulting Engineer. He holds a B.Sc. Hons (Elect. Engineering) from the University of Nairobi. He is the Managing Director of Gedox Associates Ltd. Eng. Jabongo is registered as a Consulting Engineer with Engineers Board of Kenya (EBK), a Fellow Member of the Institution of Engineers of Kenya and Association of Consulting Engineers of Kenya.

Eng. Jabongo has 32 years of experience in design and construction supervision of various projects. He has been involved in design and supervision of HT, MV and LV Power lines, Electrical, Mechanical Engineering and structured cabling design in buildings, Design and supervision of ATM installation, Estimating the cost of services for the proposed projects, providing comparative cost information during design to realize economical designs, advising on cost saving measures during the construction stage of projects, Preparation of tender documents i.e. Bills of quantities, specifications and agreements. Initiating and participating fully in tendering.

While working as a Director at Gedox Associates Ltd, Eng. Jabongo has been the Project Engineer, Project Director, Team Leader and electrical Engineer in numerous multi-disciplinary projects for Private entities, Public Bodies, and the Government Institutions.



Eng. David Mutonga - Member

Eng D M Mutonga is a professional Electrical Engineer with more 36 years of experience since graduating from the University of Nairobi with an honors degree in electrical engineering

Background

- Electrical engineering graduate of the University of Nairobi-1987
- -Worked with the Ministry of Roads and Public Works -1987-1988
- Trained by Bamburi Cement Mombasa-1988-1990
- -Worked with Kenya Co-operative Creameries(KCC) as Assistant Factory Engineer-1990-1991.
- Worked with the Nairobi

City Council(NCC) rising from Assistant Engineer 1 to Senior Assistant Engineer-Electrical(SAE)-1992-1996

- Set up an Electrical and Mechanical Consultancy firm as Principal Partner in 1996 under the name Synchroconsult Associates.

Professional

1. ERB -Registered Engineer-1995-A1711
2. IEK-Corporate Member -1995-M1310
3. EBK Registered Consulting Engineer- 2014 -E347.
4. ACEK Member- 2019 Member No100
5. Institution of Engineering and Technology(IET) Corporate
6. Member(MIET)-2003 Member No 24833455.
7. UK Engineering Council -Chartered Engineer -2006-member No 562378
8. Association of Energy Engineers (USA Atlanta)-Certified Energy Manager(CEM)-2004 .CEM No 10770 Member No 48119
9. Association of Energy Engineers (USA Atlanta)-Certified Energy
10. Auditor(CEM)-2010 -CEA-1165

11. 9.Southern African Energy Efficiency Confederation(SAEEC) 2008 -SAEEC158

12. 10.IEK Fellow-FIEK- June 2004-F1310

13. 11.EBK- Electrical Interview panel-Panellist-2020-todate

SERVICE TO ACEK

ACEK- Council member- 2023-todate

SERVICE TO IEK

1. Board member nominated by IEK at the Kenya industrial Property Institute(KIPI)-2003-2009
2. IEK Council member- 2002-2007
3. IEK -Chairman of the Functions committee-2002-2004
4. IEK -Chairman of the Industrialization and Environment committee- 2004
5. IEK -Member committee on Welfare-2016-2016
6. IEK -Member - membership committee-2018-todate
7. IEK Electrical interview panel for the Professional Review Board-2019-todate.
8. Chairman -IEK Electrical interview panel for the Professional Review Board-2019-todate



Eng. Michael O. Ogola (RCE, MIEK, MACEK) - Member

Eng. Ogola is a Managing Director at Batch Associates Ltd. He is registered Consulting Engineer with the Engineers Board of Kenya (EBK), a Corporate Member of the Institution of Engineers of Kenya (IEK) and a member of Association of Consulting Engineers of Kenya (ACEK) where he is the current Chairman of the Membership and Human Resource Committee (MHR).

He has over 26yrs experience in road and highway engineering planning, Design and Construction supervision and Technical Audit. He has also carried out design and Construction supervision of Weigh-bridges and Water supply works

He is an Expert in project feasibility studies, detailed engineering designs, design reviews, preparation of tender documents, evaluation of tenders, preparation of project reports, work programs, expenditure charts, payment certificates, construction supervision, coordination and management of Technical Audits in various capacities as Project Director, Team Leader and Measurements Engineer.

He has vast experience in data collection, analysis and preparation of detailed inventory reports and maps from road condition surveys using Mobile mapper GPS system as well as Falling Weight Reflectometer (FWD) and IRI machine for pavement

surveys.

Undertaken capacity building for various stakeholders in the roads sector including KeNHA, KeRRA, KURA, KWS and County Governments by training them on new technology and methods for Road Inventory and Condition Surveys (RICS) for planning and maintenance purposes.

He is currently involved in capacity building and training of your graduate Engineers with the aim of preparing them for Professional registration.



Eng, Dr. Johnson Matu

Dr. Johnson Matu holds a Bachelor of Science in Civil Engineering, Masters degree in Project Planning and Management and a PhD in Project Planning and Management (University of Nairobi, Kenya). He was a project coordinator of the Improvement of the Nairobi- Thika super highway, Nairobi to Mombasa standard gauge Railway and the Nairobi To Naivasha standard gauge Railway among several other infrastructure projects in Kenya. He has published on stakeholder's participation, Monitoring and Evaluation in urban road transport and infrastructural projects in Kenya. Currently, he's one of the directors of Engineers Board of Kenya and the Chairman of APEC Consortium Ltd, a firm that specializes in providing engineering consultancy services including in feasibility studies, detailed designs, project management and construction supervision of infrastructure projects, roads, airports, railways, water and sanitation including building construction. Dr. Matu experience spans 40 years in civil engineering.



Eng. Prof. Lawrence Gumbe - Member

Eng. Prof. Gumbe is the managing director of Log Associates Limited. He holds a PhD degree from Ohio State University, USA, an MSc degree from Cranfield University, England and a BSc degree from the University of Nairobi, Kenya. He is currently a member of the following Kenyan and international professional bodies; Chartered Environmentalist, Society for the Environment (SocEnv), American Society of Agricultural and Biological Engineers (ASABE), American Society of Civil Engineers (ASCE), American Society of Heating, Ventilating, Refrigeration and Air Conditioning Engineers (ASHRAE), American Society of Mechanical Engineers (ASME), Architectural Association of Kenya (AAK), Association of Consulting Engineers of Kenya (ACEK), Environment Institute of Kenya (EIK), Institution of Agricultural Engineers, United Kingdom (IAgrE), Institution of Engineers of Kenya (IEK), Kenya National Academy of Sciences (KNAS), Kenya Society of Agricultural Engineers (KSAE), Registered Lead Expert (No. 0831), National Environmental Management Authority (NEMA) and Registered Professional Consulting Engineer (No. E149), Engineers Board of Kenya (EBK). Prof Gumbe has had extensive consultancy work experience since incorporation of the company in 1994. He has worked in Kenya, Malawi, Uganda, Tanzania, Sudan, Ethiopia, Rwanda, Zambia, UK and USA.



Eng. Andrew Wahome - Member

Eng. Andrew Wahome is the Principal of Building Services Group Ltd., an engineering consultancy in Building Services Engineering. He has been in the engineering practice for over 20 years. Eng. Andrew Wahome has been involved in the engineering and management of multi-disciplinary engineering teams, for both private, parastatal and non-governmental sector projects and public sector projects.

Eng. Andrew is a Registered Consulting Engineer (RConsEng) – Engineers Registration Board (ERB), Corporate Member (AAK) – Architectural Association of Kenya (AAK), Corporate Member (MIEK) – Institution of Engineers of Kenya (IEK), Corporate Member (MCIBSE) - Chartered Institution of Building Services Engineers (MCIBSE), Associate Member (ASHRAE) - American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Member (ACEK) – Association of Consulting Engineers and has a passion for green construction having been involved in one of the pioneer green building developments in Kenya.



Eng. Kirimania Mung'eria

Eng. Mungeria Kirimania is the Managing Director and founder of Kiri Consult Limited. He is a Consulting Engineer registered with the Engineers Board of Kenya (EBK) and a Corporate Member of the Institute of Engineers Board of Kenya (IEK). He is registered member of the Environment Institute of Kenya (EIK) as a Lead Expert. Eng. Mungeria graduated from the University of Nairobi in 1990 and has remained in the profession since then. In 2012, he graduated with Masters of Business Administration (MBA) from the same university.

Eng. Mungeria worked with the Government Ministry for 13 years and thereafter started the consulting firm which he has managed for the last 18 years.



Eng. Timothy Musyomi - Member



John Robert Otieno Ogalo - GE, GMEIK, MACECK (FL), Chairman FL

Conference Magazine Sub-Editor



Eng. Paul Ochola, CE, FIEK, MACEK

A Fellow of the Institution of Engineers of Kenya and a Consulting Engineer with Engineers Board of Kenya, Eng. Paul Ochola holds an MSc. in Information Systems with specialization in Artificial Intelligence and Bsc. In Electrical and Electronics engineering, both from the University of Nairobi.

He is a Lecturer at the Technical University of Kenya (TUK) from 2023. His immediate former employer was KCB Group, where his final job function was that of Senior Manager, Power Systems. Previously, he has served at the role of Senior Manager, Network Infrastructure and Power Systems Manager at the same institution; Graduate Engineer in KPLC rising to the position of 3rd Assistant Engineer, IT & Telecoms; and Telecommunication's Supervisor with the then Electro-Sigma Company Ltd.

He has over 20 years' experience in Telecommunications and Data Communications Infrastructure Evolution review, design, delivery and management. Eng. Ochola has industry experience in Technology migration from proprietary protocols to open systems inter-connect; contract administration; and project management. He has been involved in the deployment of various projects that have led to the consolidation, convergence, and virtualization of voice, video, data center and data infrastructure platforms.

He is a member of IEK Council, Vice-Chair IEK Membership and Mentorship Committee, Chair of Mentorship Sub-Committee, Chair-IEK Legislation and Regulations Committee, KEPSA ICT Sector Board. Passionate about the mentoring of the young career professional, currently part of the mentorship team of the graduate engineers in electrical preparing for corporate admission at IEK.

Eng. Paul Ochola is also a Member of the Association of Consulting Engineers of Kenya (ACEK).

ACEK FL Committee



John Robert Otieno Ogallo -
GE, GMEIK, MACECK (FL),
Chairman Future Leaders

Ogallo has 12 years' experience expertise in supervising and managing geotechnical and foundation engineering operations, quality control testing for road design and construction and participated in geotechnical investigations and structural audits in key projects in the public and private sector of diverse models including the East and South African region e.g., Burundi, Tanzania, Somalia and Mozambique. He has extensively handled the project cycle of Infrastructure projects from feasibility studies, designs, tender documentation, developing contracts, financing and construction supervision including day to day administration of the contracts.

He is a graduate of Civil Engineering (JKUAT) a holder of Diploma Civil Engineering Kisumu Polytechnic, Certificate in Climate Change (Bondo University), Certificate in Environmental and Social Impact Assessment (JKUAT), Certificate in Non-Destructive Testing Level II and Certificate in Fundamentals of Geotechnical Engineering -FE Civil Exam from the Engineering Training Academy. He is currently studying Master of Science in Construction Engineering and Management at Jomo Kenyatta University and ongoing with Master of Science in Civil Engineering (Geotechnical Option) in DeKUT.

He is the current Chairperson of Association of Consulting Engineers of Kenya Future Leaders, a Graduate Engineer with The Engineers Board of Kenya and The Institution of Engineers of Kenya, an associate member of The Geological Society of Kenya and an Associate Expert with the National Environmental Management Authority.

He is currently engaged as assistant Materials Engineer in Uplands -Githunguri -Ruiru C560 Road Project with the Kenya National Highways Authority and a geotechnical engineer in Noitech Engineering Limited, an Independent Materials Testing and Geotechnical Company.



Eng. Barbara Adhoch, PE, MIEK,
MACECK(FL) - FL Vice Chair

Eng. Barbara Adhoch is a registered Professional Engineer with EBK, a Corporate Member at the Institution of Engineers Kenya (IEK) and a member of the Association of Consulting Engineers Kenya (ACEK) (Future Leaders). She holds a Bachelor of Science Degree from the University of Nairobi and is currently pursuing her Master of Science in Civil Engineering with a specialization in Transportation at the University of Nairobi.

An enthusiast for detail, accuracy and discipline, Eng. Barbara Adhoch is one of the emerging young lady engineers who are challenging their male counterparts in leadership roles. Currently she serves as the Vice Chair of the ACEK Future Leaders. She is the Research and Capacity Building Coordinator at ACEK, also holding the office of the CEO ACEK in an acting capacity.

Eng. Barbara Adhoch holds over 10 years post graduate experience in Civil Engineering including Highways Modelling, Technical Audits, Feasibility studies, Predesign and Design.

She has demonstrated passion for growth in the leadership areas of Strategic Planning and Execution, Critical Thinking in complex engineering domains and a multidimensional entrepreneur integration of engineering design thinking with business.



John Jairo, GE, GMEIK, MACECK
(FL) - FL Secretary

John Jairo is a Director at Spalla Ltd, a firm specializing in Construction and Project Management, with a portfolio encompassing Building, Roads, and Water Structures. He is a graduate of Masinde Muliro University, having earned a Bachelor of Science degree in Civil and Structural Engineering, and a Mandela Washington Leadership in Business Fellow, having completed his program at the University of Nevada-Reno.

In addition to his professional responsibilities, John Jairo actively contributes to various industry organizations. He currently serves as the Secretary of the ACEK (Association of Consulting Engineers of Kenya) Future Leaders Council and holds the role of Chairperson for the ACEK Future Leaders Events and Welfare Committee.



Eng. Vane Momanyi - PE, MIEK,
MACEK - Treasurer, ACEK FL

Eng. Vane Momanyi is a registered Professional Engineer, Corporate Member, Institution of Engineers Kenya, Member of the Association of Consulting Engineers (ACEK) Future Leaders Chapter, where she also serves as the Treasurer. She holds a Bachelor of Science (B.Sc. Hons) in Civil Engineering from the Jomo Kenyatta University of Agriculture and Technology in 2015 and is currently pursuing a Master of Science (MSc) in Civil Engineering (with a focus on Transportation) at the University of Nairobi.

She is an active member of the Association of Consulting Engineers of Kenya (ACEK), specifically involved in the Future Leaders' Forum. This engagement showcases her commitment to fostering the next generation of engineering professionals and facilitating growth within the industry. Eng. Vane Momanyi is a member of the Global Youth Coalition for Road Safety, demonstrating her dedication to creating safer roadways and a more secure environment for all.

Eng. Vane Momanyi's diverse skill set encompasses various aspects of civil engineering, including road design, construction supervision, and infrastructure development. She has received specialized training in Low Volume Seal Road (LVSR)

supervision and holds a Certificate in International Computer Driving License (ICDL).

She has played pivotal roles in several key projects across Kenya. Her contributions range from design and supervision to construction management, and her work has consistently met the highest standards of quality and precision. Some of the notable projects she has been involved in include the construction supervision of Moi International Airport, the design and supervision of United Nations Office in Nairobi Access Roads, and the design of roads and parking facilities for various projects.

Eng. Vane Momanyi's journey in the field of civil engineering is driven by a passionate commitment to addressing some of the most pressing challenges in Kenya and beyond. She envisions a future where sustainable infrastructure, road safety, and innovative engineering solutions contribute to improved living conditions and a stronger society.



Conference Programme



DAY 0 PROGRAMME | Sunday 15th October 2023

S/No.	Time	Description
1	2:00pm – 6.00pm	Arrival and Registration
2	3.30pm – 5.00pm	Visit to Uasin Gishu County Children Rescue Centre
		End of Day 0

DAY 1 PROGRAMME | Monday 16th October 2023

S/No.	Time	Description
1	8:00am – 8.30am	Arrival at the Conference Venue
		Opening Ceremony - Moderated by Hon. Sec.-Eng. Jane W. Mutulili Rapporteurs: Eng. Nathan Yego and Ivy Getanda
2	8:30am – 11.00 am	<ul style="list-style-type: none"> Entertainment Preambles Remarks by the Honorary Secretary, Association of Consulting Engineers Kenya, Eng. Jane W. Mutulili Remarks by the Chairman Future Leaders – John Robert Otieno Remarks by the CECM Tourism, Industrialisation, Trade, Enterprise Development and Co-operatives, County Government of Uasin Gishu, Martha Cheruto Remarks by the President, the Institution of Engineers of Kenya, Eng. Eric Ohaga Remarks by the Chairman, Engineers Board of Kenya, Eng. Erastus Mwongera Remarks by the Chairman, Association of Consulting Engineers Kenya, Eng. Patrick S. Wambulwa Remarks by Eng. John Barorot Deputy Governor Uasin Gishu County Address by H.E. Hon Chelilim Bii, the Governor, County Government of Uasin Gishu Address by Dr. Kiprono Rono, Principal Secretary, Ministry of Agriculture and Livestock Development, State Department of Crop Development Address by Eng. Joseph Mungai Mbugua, Principal Secretary, Ministry of Roads and Transport, State Department of Roads Photo Session
	11.00 am – 11.30 am	Health Break and Transition
	11.30 am. – 01.00 pm.	Plenary Session 1 Moderated by Eng. Henry Ndugah and Eng. LaToya Ouna Rapporteurs: Leonard Nyamunga and Mercy Akinyi

3		Keynote Addresses and Panel Discussions <ul style="list-style-type: none"> Director General, Kenya Rural Roads Authority, Eng. Philemon Kandie, “Efforts KeRRA is Making to Improve Connectivity in the Food Chain” Ag. Chief Executive Officer, National Irrigation Authority, Eng. Charles M. Muasya, “Water storage and use of irrigation, irrigation schemes success and failures, Case Study of Galana Kulalu” The Managing Commissioner, Kenya Meat Commission, Brigadier James Nderitu Githaga Chief Executive Officer, Kenya Private Sector Alliance, Carol Kariuki, “Critical role of the private sector in addressing food security challenges.” The Vice President, FIDIC (Fédération Internationale Des Ingénieurs-Conseils), Eng. James N. Mwangi, “Mainstreaming Climate Change in Project Designs” Question and Answers
	1.00pm – 2.00 pm	Lunch Break
	2.00pm – 3.00 pm	Plenary Session 2 Moderated by Eng. Michael Ogola and Eng. Barbara Adhoch Rapporteurs: Leah Mwai and Matilda Nimatsutsu
	2.00pm – 2.15pm	Sponsors Briefs; <ul style="list-style-type: none"> Apex Steel Bamburi Cement Promethean MEP
	2.15pm – 3.00pm	Keynote Addresses and Panel Discussions <ul style="list-style-type: none"> Head of Rural Development, Agriculture and Food Security, Delegation of the European Union to Kenya, Ms Myra Bernadi The Resident Coordinator, United Nations Kenya, Stephen Jackson The Country Director, UNOPS Kenya Multi Country office (KMCO), Rainer Frauenfeld Kenya, Trademark Africa, Ahmed Farah, “Issues Relating to Trade in the Region” The Board Secretary (Ag. Managing Director), Agriculture Development Corporation, Mr. Mohammed M Bulle, EBS Resilience Advisor for USAID/Kenya and East Africa, United States Agency for International Development (USAID), Dr. Ernest Njoroge The National Coordinator, NEDI Initiative, Gulleid Simba The Managing Director, Kenya Seed Company, Mr. Sammy Chepsiror “Facts and Myths about Genetically Modified Organism (GMO) to Food Security The Managing Director, Ditech Engineering Services, Eng. Dick Ndiewo, “AFCTA Challenges and Hopes” The Factory Manager, Chepng'eno Alice Cheruiyot, New KCC. Question and Answers
	3.00pm - 3.30pm	Tea/Coffee Break and Transition

	3.30pm – 5.00 pm	Break Away Session 1		
		Break Away Sessions 1.A	Break Away Sessions 1.B	Break Away Sessions 1.C
		Moderated by Eng. Tom Opiyo, Eng. Ken Amollo and Eng. LaToya Ouna Rapporteurs: Eng. Nathan Yego and Tony Anyange	Moderated By: Eng. Nelson Bosuben and John Robert Otieno Rapporteurs: Sarah Akoth and Faith Noella	Moderated By: Eng. Evans Goro and Eng. Francis Mwangi Rapporteurs: Ivy Getanda and Mercy Akinyi
		Infrastructure, Roads, Transport and Rural Housing	Irrigation and Water Resources	Manufacturing and Agro Industries
5	3.30 pm – 4.00pm	Keynote Address: Remarks by the CECM Transport, Public Works and Roads, County Government of Uasin Gishu, Joseph Kiplagat Lagat	Keynote Address: <ul style="list-style-type: none"> Personal insights on the Galana Kalalu Irrigation scheme Eng. Jelemano Gichohi- Farmtech and Irrigation Services Ltd <ul style="list-style-type: none"> Remarks by the CECM Agriculture, Livestock and Fisheries, County Government of Uasin Gishu, Edward Sawe	Keynote Address: <ul style="list-style-type: none"> Innovation and Technology in Fostering Food Security Erastus Makena, Hub Manager Agribiz Program
		Technical Papers Presentations		
	4.00 pm – 5.00pm	<ul style="list-style-type: none"> Safety Features in Road Designs to Improve Sustainable Mobility in Emerging Economies of the World. – Case Study of Kenyan Highways Isaac Ochieng' Were, Eng. Nicholas Airo, PE, MIEK Systematizing Planning and Rehabilitation of Critical Market Access Infrastructure to Alleviate Food Insecurity in South Sudan Mr. Emmanuel Kweri Dijango 	<ul style="list-style-type: none"> Enhancing Affordable Water Access and Resilience to Climate Change Through PAYG Solar Water Pumping Solutions and Water Conservation Irrigation Methods: A Case Study in Gilgil, Kenya. Brian Nyagol, Norman Chege, Stephen Wambua Minimizing Water Losses and Ensuring Food Security in Kenya: Engineering Approaches and Best Practices Eng. Rosana, Clinton Maroria, PE, MIEK 	<ul style="list-style-type: none"> Sustainable Food Storage in Kenya: A Case for Digital Transformation of Grain Storage Facilities and Interconnectedness Using Electric Grid Fiber-Optic Infrastructure Eng. Eric Wekesa Wanjala Enhancing Food Security in Kenya: Exploring the Role of Public Private Partnerships in Agricultural Development in ASALs, John Jairo, Eng. Yvette Olende

	6.00pm – 8.00 pm	Welcome Cocktail
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DAY 2 PROGRAMME | Tuesday 17th October 2023

S/No.	Time	Description
1	8:00am – 9.00am	Arrival at conference venue and settling in of Delegates and Staff at Sirikwa Hotel/Sponsors
		Plenary Session 3 Moderated by Eng. David Mutong, Ivy Getanda and Eng. Ken Kiunga Rapporteurs: Sarah Akoth and Faith Noella
2	9:00am – 11.00 am	Keynote Addresses and Panel Discussions <ul style="list-style-type: none"> The Registrar/CEO, Engineers Board of Kenya, Eng. Margaret Ogai, “Journey to Washington Accord, Graduate Engineers Training Programme, CPD” The Chairman, Association of Professional Societies in East Africa, Prof. Nicholas K. Letting “The Importance of Maintaining the Highest Professional Standards in Addressing Food Security Challenges” The Deputy Vice Chancellor, University of Eldoret, Prof. Wilson Ngétich The Chief Executive Officer, Moi Teaching and Referral Hospital, Dr. Wilson K. Aruasa Prof. Eng. David Some, Professor, University of Eldoret Question and Answers
	11.00 am – 11.30 am	Tea Break
	11.30 am. – 1.00 pm.	Machinery, Energy, Mechanization, Economics and Finance Moderated by Eng. Kariuki Muchemi and Eng. Paul Otuoma Rapporteurs: Leah Mwai and Tonny Anyange
3	11.30 am- 11.45 am.	Keynote Addresses: <ul style="list-style-type: none"> The Managing Director, Kenya Pipeline Company, Joe Sang, “Future of Fossil Fuels and Food Security” The Ag. General Manager, Strategy Research, and Innovation. Geothermal Development Company, Eng. Martha Mburu The General Manager, Rural Electrification and Renewable Energy Corporation, Eng. Fred Ishugah
	11.45 am-1.00 pm	Technical Paper Presentations <ul style="list-style-type: none"> Mechanization of Agriculture for Industrialization in Kenya, Eng. Prof. Lawrence Gumbo Agricultural Mechanization Status in Kenya, Eng. Prof. Ayub N. Gitau, Martin M. Nanje, Simon T. Mwangi Policy, Institutional and Legal Challenges Facing Agricultural Mechanization in Kenya, Eng. Richard Kanui The Attractions of Renewable Energy to Power Kenya Now and Beyond – Eng. Mwamzali Shiribwa Question and Answers
		<ul style="list-style-type: none"> Remarks by the CECM Youth Affairs, Sports, ICT and Innovation, County Government of Uasin Gishu, Lucy Ngéndo

	1.00pm – 2.00 pm	Lunch	
	2.00pm – 3.30pm	Break Away Session 2	
		Break Away Sessions 2.A Moderated by Eng. Dick Ndiewo and John Jairo Rapporteurs: Mercy Akinyi and Matilda Nimatsutsu	Break Away Sessions 2.B Moderated By Eng. Timothy Musyomi and Eng. Yvette Olende Rapporteurs: Eng. Nathan Yego and Ivy Getanda
		Environment, Climate Change and Urban Agriculture	Education, Research, Practice and Emerging Technologies
4	2.00 pm – 2.30pm	Keynote Address: <ul style="list-style-type: none"> Advancing Technology in Tea Production for Food Security Michael Cherutich, General Manager, TEMEC	Keynote Address: <ul style="list-style-type: none"> Food Security in Kenya and Areas of Collaboration Dr. Agnes Kalibata- The President- Alliance for Green Revolution in Africa <ul style="list-style-type: none"> Remarks by the CECM Youth Affairs, Sports, ICT and Innovation, County Government of Uasin Gishu, Lucy Ngendo
		Technical Papers Presentations	
5	2.30pm – 3.30pm	<ul style="list-style-type: none"> Solid Waste Management in Kenya - Ali Adan Climate Resilient Contracts: An Essential Tool to achieve SDG 9 – Industry, Innovation, and Infrastructure - Eng Latoya Ouna Optimizing Use of the Utility Grid Power Supply to Grow the Use of Clean Cooking of Agro-Processing Industry in Kenya - Oscar Masheti Avukuse, Kahoro Wachira Renewing Nairobi River - Claudia Bess Sustainable Food Production through Utilization of Prison Land and Labor: Sustainable Practice and Emerging Technologies - Agwanda Nicholas Ochola Investigation of Barriers Towards Holistic Wellness and Mental Health Triggers for Young Engineers Practice in Kenya - Isaac Ochieng' Were 	
	3.30pm	Tea/Coffee and Transition	
		Plenary Session 4: Acek Future Leaders Moderator; Eng. Barbara Adhoch and Sarah Akoth Rapporteur: Tony Anyange and Mercy Akinyi	
6		1. Eng. Ken Kiunga – ACEK Future Leaders Past Chairman, 2015/2017 2. Eng. La Toya Ouna – ACEK Future Leaders Past Chairlady, 2017/2019 3. Eng. Francis Mwangi – ACEK Future Leaders Past Chairman, 2022/2023 4. John Robert Ogallo – ACEK Future Leaders Chairman, 2023/2024 5. Eng. Ken Amolo – ACEK Future Leaders Member 6. Eng. James N. Mwangi – Vice President, FIDIC	

	4.30pm – 5.30 pm	Closing Ceremony Moderated by the Hon. Treasurer Eng. Gabriel Jabongo Rapporteurs: Mercy Akinyi, Leah Mwai, Faith Noella, Sarah Akoth, Leonard Nyamunga, Tony Anynage, Matilda Nimatsutsu, Eng. Nathan Yego and Ivy Getanda
7	4:30pm-4:00pm	<ul style="list-style-type: none"> Remarks by the Honorary Treasurer Eng. Gabriel Jabongo Conference Resolutions by Hon Secretary Eng. Jane Mutulili
8	5.00pm-6.00pm	<ul style="list-style-type: none"> Remarks by the Honorary Secretary, Association of Consulting Engineers Kenya, Eng. Jane W. Mutulili Remarks by the President, the Institution of Engineers of Kenya, Eng. Eric Ohaga Remarks by the Registrar/CEO, Engineers Board of Kenya, Eng. Margaret Ogai Remarks by the Chairman, Association of Consulting Engineers Kenya, Eng. Patrick Wambulwa Closing Ceremony Remarks by the Chief Guest, H. E. Hon Kenneth Lusaka, the Governor, County Government of Bungoma
	6.00pm – 7.00pm	Transition
	7.00pm	Gala Dinner and Partners Promotion <ol style="list-style-type: none"> 1. SBS Tanks 2. Wilo EA 3. KSB Pumps & Valves Ltd 4. TEMEC 5. CiviStruct 6. Davis & Shirtliff 7. Kenya Building Research Centre 8. Isuzu 9. ICEA Lion Life Assurance One Man Guitar By Reuben Kigame

DAY 3 PROGRAMME | Wednesday 18th October 2023

S/No.	Time	Description
1	8:30am – 9.30am	Arrival of and registration of Delegates and Staff at Sirikwa Hotel/Sponsors – Coordinated by John Robert Otieno
2	9.00am – 5.00pm	Exhibitions Tours at Sirikwa Hotels
3	9.00am – 5.00pm	Departure to various Technical Site Visits <ul style="list-style-type: none"> • Uasin Gishu County Agricultural Machinery Centre (AMC) located at Chepkolel • Chebut Tea Factory Kapsabet • North Rift Water Works Development Authority Sites • Chebara Dam & Water Treatment Works • Boundary Wastewater Works (Kipkeyo) • Kipkaren Dam & Water Treatment Works • New KCC Eldoret • Unga Millers Eldoret • Buffalo Millers/Kili Farms • Votalia Kenya Solar Power Plant • Self-Directed Tour of the City
		End of Conference and Departure



PAPERS



SAFETY FEATURES IN ROAD DESIGNS TO IMPROVE SUSTAINABLE MOBILITY IN EMERGING ECONOMIES OF THE WORLD. CASE STUDY: KENYAN HIGHWAYS.



Isaac Ochieng' Were & Eng. Nicholas Airo
 Bayana Construction (EPC) Limited, Nairobi; NAS
 International Holdings Limited, P.O. Box 7514-00200, Nairobi
 Email: isaac.were10@gmail.com | 0702 789 657

Abstract

Road accidents in major highways are a menace to daily transit. Major highways handle very high traffic volumes, characterized by both human and natural hazards, and low geometric standards. Uncontrolled roadside developments in urban settlements have led to narrowing of the road reserve. As a result, land acquisition and or demolition or court cases has led to high construction costs, project time wastage and sometimes lesser safe designs. Fatigue in drivers travelling long distances could also lead to drivers falling asleep on the steering wheel and endangering other road users. It is important that strict control measures are put in place to restrict land use and roadside development, on the same accord, expand the right of way from the standard minimum 60m to say 80m, to accommodate all required road features like NMTs, Motorcycle Lanes and Wayleaves to be incorporated into the existing Cross-

Section of the Kenyan Highways. This paper also proposes introduction of Rest Stops on Highways with such facilities like theme parks, well equipped hospitals to cater for unforeseen accident victims, garages for servicing vehicles on transit, motels and restaurants for people on transit, firefighting equipment in case of emergency response during accidents among other features. Implementation of strict roadside development and early land acquisition, expansion of the right of way to include all the necessary safety features on the Cross-Section, and developing of Roadside Stops would greatly help manage accidents and encourage sustainable mobility, improving the safety of all road users.

Key Words: Uncontrolled roadside developments, rest stops, the cross section, sustainable mobility

MINIMIZING WATER LOSSES AND ENSURING FOOD SECURITY IN KENYA: ENGINEERING APPROACHES AND BEST PRACTICES



Eng. Rosana, Clinton Maroria, PE, MIEK
Kenya National Highways Authority, P.O. Box 49712 – 00100, Nairobi
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Abstract

Achieving food security is a critical global challenge, particularly in regions facing water scarcity. Optimal utilization of water and water resources plays a pivotal role in enhancing food security. In Kenya, the country's agricultural and water sector is grappling with enormous water losses, resulting in substantial financial implications. These losses represent a missed opportunity, as the savings could significantly contribute to improving food security in the country. To address this issue, it is imperative for engineers to develop methodologies that enhance water savings and ensure an adequate supply of water to farms, irrigation schemes, and arid and semi-arid areas with fertile soils suitable for agriculture.

This research paper aims to explore the irrigation and water resources landscape in Kenya, with a specific focus on the magnitude of water losses experienced and their impact on food security. The study adopts a secondary research approach, utilizing statistical data gathered from various sources such as books, organization websites, internet resources, newspapers, magazines, and water organizations' data on water use. Through rigorous statistical analysis, the collected data is examined to derive conclusive and informative results.

The findings of this research underscore the urgency of addressing the significant water losses in Kenya. These losses not only affect water availability for agricultural purposes but also result in substantial financial burdens

for the country. The potential savings from minimizing water losses could be redirected towards improving food security, a crucial concern for Kenya's population. Consequently, this paper presents a range of recommendations aimed at reducing water losses through effective engineering techniques.

By optimizing water utilization and implementing efficient management practices for water resources, it is possible to enhance food security in Kenya. The identified engineering techniques provide a roadmap for sustainable water management, ensuring a more reliable water supply for agriculture and mitigating the impacts of water scarcity in arid and semi-arid regions.

In conclusion, this research paper offers valuable insights into the irrigation and water resources landscape in Kenya, highlighting the need to minimize water losses to enhance food security. The conclusive findings and informative recommendations derived from statistical analysis can guide policymakers, engineers, and stakeholders in devising strategies to achieve optimal water utilization and secure a more sustainable future for agriculture in Kenya.

Keywords: Water Losses, Engineering techniques, Water savings, Food security, Water resources, Irrigation.

ENHANCING AFFORDABLE WATER ACCESS AND RESILIENCE TO CLIMATE CHANGE THROUGH PAYG SOLAR WATER PUMPING SOLUTIONS AND WATER-CONSERVING IRRIGATION METHODS: A CASE STUDY IN GILGIL, KENYA.

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Stephen Wambua,
Brian Nyagol

This abstract presents the findings of a study by Davis & Shirliff in July 2023, addressing water access challenges and climate resilience among low-income Gilgil, Kenya farmers. The research assessed the feasibility of adopting Pay-As-You-Go (PAYG) solar water pumping solutions and water-conserving irrigation methods to mitigate water scarcity and enhance agriculture.

Demographically, the study covered diverse farmers, with 54% male and 46% female respondents. Despite proximity to the River Malewa, grid unavailability and limited water infrastructure posed significant challenges. Shockingly, all respondents lacked grid access, with 85% relying on unpredictable rainfall as their main water source. Strikingly, respondents near the river faced difficulties drawing and storing water, with 85% lacking adequate water-drawing systems.

Water scarcity significantly affected farming, with 54% reporting a single annual harvest and 38% harvesting twice a year. Average income per harvest was KES 27,456.15

(\$192.72). Respondents believed increased water availability could lead to more frequent harvesting and crop diversification. Their average farm size of 1.54 acres accentuated the water scarcity challenge.

Qualitative insights highlighted challenges, notably water-drawing mechanism availability (69%), inadequate rainfall (69%), financial constraints, intermediaries, pricing instability, and cash flow issues. Respondents suggested solutions, including accessing

local river water (69%), solar water pumping (38%), collective water pumping and storage (31%), and irrigation systems (23%).

PAYG Solar Water Pumps resonated with respondents, with 46% seeing it as a means to enhance crop diversification, multi-season harvesting and increase income as well as give access to technologies they would otherwise not been able to afford upfront. Additionally, 38% believed it would ensure ongoing water access, and 23% thought it would support the community. Respondents also called for local market support (46%) and a resolution to water scarcity (31%).

The study recommended adopting water-conserving irrigation methods, particularly drip irrigation, due to its precision in water usage, minimized wastage, and optimized crop growth in water-scarce environments.

In conclusion, this research advocates a comprehensive approach to address water scarcity and climate resilience among low-income farmers. Findings highlight the potential of PAYG Solar Water Pumps and water-conserving irrigation methods to transform agriculture, increase income, and foster community development. By tackling challenges through innovative, sustainable solutions, this study empowers vulnerable communities, emphasizing solar energy's significance in sustainable development and underpins the importance of providing financing options through Pay-as-you-go to reduce the acquisition cost of solar pumping technologies.

ACFTA CHALLENGES AND HOPES

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Abstract

Africa does not trade enough with itself. The reasons and excuses are many but key among them are the lack of infrastructure, language barriers, sibling rivalry and mistrust.

The African Union set up mechanisms and steps in the 90s to increase intracontinental trade and there have been successive steps though with minimum tangible results and in the later part of the last decade the idea of Africa Continental Free Trade Area came in. 5 areas have been selected to kickstart the process and 21 have so far countries signed up.

Professional Engineering was not among the first areas chosen although not to be left behind Engineers have started preparing themselves for the eventual accommodation in the ACFTA framework. Mutual recognition agreements have already been put in place especially in the regional blocks with varying degrees of success. Kenya being a powerhouse in engineering services has seen its Engineers and Engineering bodies take the lead in pursuing the ACFTA dream.

With all the efforts being put in place Kenya is considered protectionist and if this continues the country may not reap the maximum benefits of ACFTA. It is apparent that despite

being the big economy in the region with big infrastructure projects we are afraid of competition and would like to protect our market but at the same time benefit from other markets. This is historical but may not yield the desired results in the new dispensation.

As the ACFTA secretariat continues to grapple with what to do with engineering services can the East African Engineering pushed by the Engineering bodies take the lead and do the following

Push the Governments to have one engineering registration body across the region.

Allow members to operate without limit within the EAC borders.

Urge members to build bigger Engineering Forms with capacity to do the big engineering projects.

To promote professionalism and eliminate the Contractor control that is prevalent at present.

It is only when the above is done that we will begin to benefit from the ACFTA dream.

AGRICULTURAL MECHANIZATION STATUS IN KENYA

Ayub N. Gitau¹
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Abstract

The demand for food and raw material is increasing significantly with the expanding world's population. Although the usage of improved varieties has grown significantly in the last 2 decades, climate change and low use of technology across the agricultural production chain limits productivity in Kenya. Kenya is focusing on mechanizing the agricultural sector to boost labour and land productivity. The key focal areas are land preparation, crop management, harvesting and post-harvest processing. This paper focuses on the status of mechanization in Kenya with a specific focus on machinery density, myths and challenges as well as opportunities for future development. Kenya has a tractor density of 3.2 tractors per 1,000 hectares, indicating the need for further development. To overcome these challenges and improve agricultural mechanization, Kenya requires improved access to financing, strengthened regulation and effective policies. Supporting mechanization involves education, technology development, local production, quality assurance, investments, extension services, technology adoption, and institutional and legal framework enhancements. State-led mechanization programmes in the past have failed and therefore mechanization has been generally ignored in the literature. Misconceptions, such

as “mechanization leads to unemployment” potentially undermining the benefit of agricultural mechanization. The main sources of agricultural power in Kenya are human, animal and motorized energy sources. Currently, motorized power utilization is at 30%, manual power at 50% and animal draught power (ADP) at 20%. To enhance agricultural mechanization, technologies that are socially acceptable, economically viable, and technically feasible must be promoted, catering to diverse socioeconomic contexts. Governments should prioritize agricultural policies supporting small-scale farmers while fostering commercial farming sector development. In-service training for extension officers, artisans and entrepreneurs is essential for improving their understanding of power and mechanization options. Strengthening input supply networks and promoting manufacturing for agricultural operations and processing technologies are crucial steps towards advancing agricultural mechanization in Kenya.

Keywords: mechanization, value-addition, agro-processing, technology, mechanisation policy

MECHANIZATION OF AGRICULTURE FOR INDUSTRIALIZATION IN KENYA

Lawrence O. Gumbe

Abstract

This paper discusses the agricultural mechanisation, challenges facing mechanisation and concludes that, for economic development, and to ensure survival, Kenya must industrialize their economies and mechanise their agriculture using modern scientific technologies.

ENHANCING FOOD SECURITY IN KENYA: EXPLORING THE ROLE OF PUBLIC-PRIVATE PARTNERSHIPS IN AGRICULTURAL DEVELOPMENT



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Abstract

Sustaining food security in Arid and Semi-Arid Lands (ASALs) in Kenya has been a challenge for the government, with an estimated 4.4 million people (27% of the ASAL population) facing high levels of acute food insecurity (IPC, 2023). Whilst there have been interventions, including Public-Private Partnerships (PPPs) focusing on agricultural food products, such as, drought tolerant crops, with the aim of developing value chains, there has been none focused solely on enhancing food production in ASALs. This research therefore, seeks to investigate the role of PPPs in enhancing agricultural development in ASAL regions.

The research will be conducted by reviewing existing literature related to PPPs, agricultural development, food security in ASALs of Kenya, and existing policies and regulatory frameworks related to PPPs that have addressed agricultural development. We will explore previous studies that have examined PPPs in agricultural development, to identify successful models, challenges faced, gaps that may hinder the successful

implementation of PPPs and lessons learned. From the literature review, we will perform a comparative analysis of successful PPPs that have enhanced agricultural development. This analysis will help identify best practices, strategies for effective collaboration, and potential adaptations for improving food production in ASALs.

Through the exhaustive research and comparative analysis, we were able to collate the data, assess it and make an informed conclusion on the role of PPPs in agricultural development.

This paper can be used by private investors, farmer associations, and the Ministry of Agriculture, in recommending the need for a strong regulatory framework, effective risk management, and appropriate project governance to ensure the success of PPPs in improving food security in Kenya.

Keywords: Food Security, Public-Private Partnerships, Agricultural Development, Agricultural Productivity, ASALs.

POLICY, INSTITUTIONAL AND LEGAL CHALLENGES FACING AGRICULTURAL MECHANIZATION IN KENYA

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Abstract

Agriculture is the backbone of the Kenyan economy contributing directly 22.4 percent of the Gross Domestic Product (GDP) in 2022. The sector is therefore a key driver towards the realization of the 10 percent annual economic growth envisioned in Kenya Vision 2030, Agriculture Sector Growth and Transformation Strategy (ASTGS 2019-2029) and Bottom-Up Economic Transformation Agenda (BETA) with specific focus on, Food & Nutrition Security, Manufacturing; Agro-processing and Incubation of Micro, Small and Medium Enterprises (MSMEs) for various agricultural value chains. It also plays a key role in respect to reduction of extreme poverty and hunger in line with the Sustainable Development Goals No. 1 and 2 respectively.

Agricultural mechanization can have major influence on food and nutrition security, be a basis for agro-industrial take-off, employment creation and improved incomes for Kenyans. However, the level of mechanization of Kenya's agriculture remains low and inadequate to spur the required growth and commercialization of agriculture owing to various policy, institutional and legal challenges.

The government has endeavored to develop an Agricultural Mechanization Policy aimed at improving agricultural mechanization for the sub-sector to measurably contribute to

agriculture sector growth and development in Kenya. This Policy has endeavored to capture the aspirations enshrined in the Agricultural Sector Transformation and Growth Strategy (ASTGS - (2019-2029)) aimed at commercializing and making the agriculture sector competitive for long-term national economic development as envisaged in Kenya Vision 2030 and Bottom-Up Economic Transformation Agenda (BETA).

Agricultural mechanization as a key input in the agriculture sector enhances productivity along crops, livestock, fisheries and agroforestry value chains. However, agricultural mechanization has not been explicit in transforming agriculture in tandem with increasing food requirements locally and regionally.

This paper looks at the policy, institutional and legal challenges facing agricultural mechanization in Kenya and interventions to address them.

Key Words: Agriculture Sector, Agricultural Mechanization; Agricultural Mechanization Policy;

Legal, Institutional, Agricultural Mechanization Hubs, Private Sector, Public Sector and Public Private Partnership.

SUSTAINABLE FOOD STORAGE IN KENYA.



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Abstract

Post harvest loss and waste is still a major challenge in realization of food security. Understandably, the Kenyan government effort to increase food production is important but food losses must be eradicated for success. Good food security strategy ensures alignment of food production and proper post-harvest management to avert costly losses and waste. It is noteworthy that food waste also has an undesirable consequence of carbon dioxide emission(s).

According to Intergovernmental Authority on Development (IGAD) report on Regional Postharvest Loss Management Strategy, 2021, reported Kenya as one of the IGAD countries with high loss of grains due to handling, and storage. Further, the Food and Agriculture Organization – FAO report on “Food Loss Assessments: Causes and Solutions Case Studies in Small-scale Agriculture and Fisheries Subsectors”, 2014, post-harvest losses reported as significant contributors to food insecurity in Kenya. Typically, over 60% of post-harvest grain loss in Bungoma and Tran Nzoia regions renowned for growing grains attributable to

poor storage. Public and private grain storage facilities are critical components in food security value chain. However, inefficient monitoring, lack of tracking and automation systems compromise both the quantity and quality of stored food.

This concept proposes interconnectedness of all food storage facilities in the country into one food ecosystem network. This will use existing electricity supply grid for digital highway infrastructure using fiber optic and wireless technologies. This will facilitate digital transformation of the facilities and adoption of Internet of things IoT for remote monitoring of both environmental (temperature, humidity, hydration, etc.) and storage volumes in real-time from a centralized command or emergency center for the country. The objective is to better food storage both fresh and grains ensuring sustainable food security for populations including emergency situations.

Key Words: Food Security, Storage, Sustainable, Digital, Transformation, Electric Grid, Fiber Optic,

CLIMATE RESILIENT CONTRACTS: AN ESSENTIAL TOOL TO ACHIEVE SDG 9 – INDUSTRY, INNOVATION, AND INFRASTRUCTURE

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Abstract

In 2015, The UN General Assembly adopted the 2030 Agenda for Sustainable Development that includes 17 sustainable goals. Building on the principle of “leaving no one behind”, the new agenda emphasises a holistic approach to achieving sustainable development for all. These goals serve as the framework to achieve a better and more sustainable future for all (FIDIC, Ramboll, ARCADIS, 2023). The UN has defined 8 targets and 12 indicators for SDG 9. This paper will delve into SDG Target 9.1 which focuses on developing sustainable, resilient, and inclusive infrastructure.

Extreme weather events have caused significant human and economic losses over the past half-century. Climate change scenarios for many Sub-Saharan African countries indicate that temperatures will increase with uncertain precipitation patterns. The potential impact of climate change on economic systems is also well-known. (Daniel Kwabena Twerefou, 2014) Addressing the effects of climate change on infrastructure necessitates a fundamental shift in how we conceptualize, design, and construct our infrastructure (FIDIC, WWF, AECOM, 2023). This transformation must involve the entire infrastructure sector and depend on the

collective commitment of customers, clients, companies, professionals, and governments, all aligning their efforts toward a common objective (FIDIC, Ramboll, ARCADIS, 2023)

Through extensive desk study, this paper shall explore the pivotal strategy for realizing resilient and sustainable infrastructure through continuous innovation and updating of our construction contracts. Climate resilient contracts adopt a lifecycle perspective on infrastructure delivery, through early intervention commencing from embracing green procurement processes, adopting low-carbon design and construction principles. They also cushion construction projects against climate risks. The paper will also discuss the criteria for delivering solutions across the project's lifecycle and, concurrently, encompass the interests, uncertainties, responsibilities, and risks encountered by all parties involved in the face of disruptions caused by extreme weather events and resultant economic losses.

Keywords: Sustainability, Infrastructure, Procurement, Contract Management, Climate Resilience,

OPTIMIZING USE OF THE UTILITY GRID POWER SUPPLY TO GROW THE USE OF CLEAN COOKING OF AGRO-PROCESSING INDUSTRY IN KENYA

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Abstract

According to a 2021 report by the World Food Program, over 1.6 million people across the globe were provided with direct access to clean cooking. The report further states that over 50,000 people were provided with direct access to energy products and services for productive uses. A year earlier, the WFP reported an estimated 170,000 fuel efficient stoves were distributed to homes and schools. This paper seeks to change the narrative by use of clean cooking alternatives

using electricity products and services away from other energy sources.

We shall be looking at what Kenya is doing in a bid to address the climate change agenda in the clean cooking of agro-processed foods in the value addition supply chain..

Keywords: clean cooking, climate change, agro-processing

SUSTAINABLE FOOD PRODUCTION THROUGH UTILIZATION OF PRISON LAND AND LABOR: SUSTAINABLE PRACTICE AND EMERGING TECHNOLOGIES.



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Abstract

This article explores the concept of utilizing prison land and labor to tackle the global challenge of sustainable food production while simultaneously promoting rehabilitation and social responsibility. The primary methods discussed in this study include vocational training programs within correctional institutions, partnerships with local farms, the use of emerging agricultural technologies, and urban farming initiatives in correctional institutions.

The major results and findings of this overview include the recognition of the significance of vocational training programs in equipping inmates with agricultural skills, making them employable in the agricultural sector upon release. Partnerships with local farms and research collaborations enable the implementation of sustainable practices such as organic farming and resource-efficient techniques. Emerging technologies like automation and hydroponics are highlighted for optimizing productivity while minimizing resource consumption.

Urban farming initiatives within correctional facilities provide hands-on experience in sustainable agriculture, benefiting both food supply and rehabilitation efforts. The importance of post-release training programs and employment partnerships with local farms is emphasized, ensuring that individuals trained in prison can continue contributing to sustainable food production.

Moreover, ethical considerations are stressed to uphold prisoners' rights, fair compensation, and rehabilitation efforts. In summary, this approach offers great potential for addressing food security challenges, promoting rehabilitation, and advancing environmental sustainability by integrating professional training, sustainable practices, agricultural techniques, and post-release support into the correctional system.

Keywords: Training programs, Sustainable practice, Emerging Technologies, Food security and Environmental sustainability

INVESTIGATION OF BARRIERS TOWARDS HOLISTIC WELLNESS AND MENTAL HEALTH TRIGGERS FOR YOUNG ENGINEERS PRACTICE IN KENYA.



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Abstract

Holistic health is a wellness approach that simultaneously addresses health's physical, mental, emotional, social, and spiritual components (St. Catherine University Publication, United States, 2022). National broadcasting stations, newspapers, and other publications have continuously highlighted the mass migration of young Kenyan engineers to other professions, unwavering suffering due to high unemployment rates, low remuneration coupled with high inflation rates, besides unstructured work environments. A chapter in Thermodynamics and Statistical Mechanics introduction reads, "Ludwig Boltzmann, who spent much of his life studying statistical mechanics, died in 1906, by his own hand. Paul Ehrenfest, carrying on his work, died similarly in 1933. Now it is our turn to study statistical mechanics. Perhaps it will be wise to approach the subject cautiously." Ehrenfest's famous introduction depicts the prevailing culture within the engineering world that accepts suffering and sacrifice as an inevitable part of the profession. Instead, this paper challenges this prevailing culture and advocates a paradigm shift towards

embracing holistic wellness as a fundamental pillar of engineering practice. In 2022, Long et al. undertook a study to identify the specific processes and strategies used by 21 professional counselors who integrate wellness into clinical practice and identified five main themes: wellness assessment, skills, interventions, barriers, and advocacy. Opinions from a sample of 324 Kenyan graduate engineers on holistic wellness were sourced through questionnaires and direct interviews. This research paper identified several mental health triggers for young engineers like unemployment and insecurity, barriers to creating healthy work environments, and proposed holistic wellness sensitization, structured mentorship, among other ways of improving mental wellness for young engineers in Kenya.

Keywords: Mental health, young engineers, unstructured work environments, remuneration, holistic wellbeing, unemployment, depression.

ROLES OF WATER-ENERGY-FOOD-ECOSYSTEM NEXUS IN ATTAINING THE SUSTAINABLE DEVELOPMENT GOALS, A CASE OF DANDORA ESTATE SEWAGE TREATMENT WORKS IN NAIROBI, KENYA

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Abstract

Increasing trends for depletion of natural resources due to impacts of climate change, economic growth and demographic pressure have been reported. Notwithstanding, globalization has put more pressure on existing resources, ecosystems, and biodiversity hence affecting the population's well-being. Under dynamic environment, identification and implementation of sustainable adaptation strategies has been an hinderance to social development, economic growth, and partnerships. The water-energy-food-ecosystems (WEFE) Nexus approach deviates from sector specific focus on food, water, energy, and ecosystems. To

reap positive synergies while managing the tradeoffs, the approach allows for analysis of interlinkages between the sectors in attaining the set goals. The study objective was to assess the roles of WEFE Nexus in attaining the Sustainable Development goals for Dandora Estate Sewage Treatment Works, Nairobi (DESTW). Descriptive method was utilized to access the roles of DESTW in attaining the SDGs through provision of water, food, energy, and ecosystem.

Keywords: Water-energy-food-ecosystems Nexus; Wastewater; Sustainable Development Goals



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