



THE SUGAR INDUSTRY INNOVATION SYMPOSIUM 2023

REPORT



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INTRODUCTION

The Kenyan sugar industry spans a century of growth, with its origins in the 1920s at Miwani in Nyando and Ramisi at the Coast. To date however, even with 15 sugar factories currently in operation, sugar self-sufficiency has remained elusive. An ever-changing business environment and regulatory challenges, coupled with changing weather patterns have led to fluctuations in sugar production impacting consumers and industry stakeholders alike. The Kenyan government has taken various measures to revitalize the sector, including the setting up of a sugar industry task force that has come up with a blue-print for the revitalization of the sector; the development of a Sugar Industry Policy; and a strategic intervention to lease the poorly performing state-owned mills to private sector entities. The transition from a weight to quality-based cane payment system is also a specific intervention aimed at incentivizing farmers to produce good quality cane and millers to improve sugar recovery.

Despite these initiatives, the sugar industry in Kenya continues to face obstacles that hinder its full potential. To ensure sustained growth and competitiveness, there is a pressing need for further investments in research and development, infrastructure, and value addition along the sugar supply chain. Moreover, implementing policies that strike a balance between protecting domestic producers and promoting fair trade practices on the international stage will be critical for the industry's long-term viability. Ultimately, addressing these challenges and harnessing the industry's potential will foster economic development, alleviate poverty, and strengthen Kenya's position as a key player in the global sugar market.

THE EVENT



The Agriculture and Food Authority - Sugar Directorate hosted the second annual Sugar Industry Innovation Symposium in Kisumu at the Grand Royal Swiss Hotel from 5th to 7th December 2023. The event themed “Towards Self Sufficiency,” convened key stakeholders, experts, policymakers, innovators, and researchers from the Kenyan sugar sector to address the pressing challenges, exchange knowledge, and explore opportunities for growth and advancement. It provided a premier platform for industry players to exhibit and showcase the latest innovations in sugar processing techniques, agronomy, environmental conservation, market

dynamics, and sustainable practices that mitigate the impact of climate change and promote eco-friendly operations.

Distinguished speakers and thought leaders shared insights, research findings, and success stories during plenary sessions, keynote presentations, and panel discussions that were anchored on the following thematic areas:

- i. Enhancing the value of small-scale sugarcane farmers
- ii. Unlocking soil potential for improved sugarcane productivity
- iii. Modern milling technologies to minimize wastage
- iv. Adoption of mechanization to improve efficiency in the sugar industry
- v. Leveraging digital innovations for sustainability of the sugar value chain
- vi. Sugar value chain financing
- vii. Climate change resilience and mitigation

The discussions and presentations addressed the role of digitalization, data analytics, and diversification of sugar by-products in optimization of resources management, creation of new revenue streams and waste reduction. By pursuing self-sufficiency, the symposium strived for environmental sustainability, operational resilience, reduced dependence, and a self-sustainable sugar industry.



INNOVATION
BETWEEN
AND REAL
TRANSFORM
SOLUTIONS

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INNOVATION IS THE BRIDGE
BETWEEN IMAGINATION
AND REALITY, WHERE IDEAS
FORM INTO TANGIBLE
SOLUTIONS THAT SHAPE OUR
WORLD

PLENARY HIGHLIGHTS

HON. CORNELLY SEREM

Board Chairman, Agriculture and Food Authority (AFA)



“Embracing technology and innovation along the sugar value chain is key towards re-engineering the sugar sub sector. Recently, the industry experienced an acute shortage of cane to be crushed therefore the mills operated way below their crushing capacities.

Production for the year could not meet the local demand thus a deficit in local sugar production.

There is a need to implement a comprehensive strategy that combines enhanced research, cane development activities, contractual

farming, diversification, value addition, and environmental sustainability. Integration of these approaches promises a reliable supply chain of raw materials to ensure optimal crushing capacities hence fostering self-sufficiency.

There is a need to capacity build the smallholder farmers to enhance adoption of modern farming technologies and practices. Access to quality seed cane and adoption of improved sugarcane varieties is key towards transitioning to the Quality Based Cane Payment System.”

DANIEL KITIVO, OGW

Board Member, Agriculture and Food Authority (AFA)

“Climate change has posed significant challenges for sugarcane production in the country.

This has tested our resilience, demanding innovative solutions to navigate through its impacts on our crops and livelihoods.

As we discuss the dynamics of our industry, it’s crucial to recognize the diversity of challenges faced across regions and unite in seeking solutions that cater to these distinct landscapes.

By fostering a collaborative spirit

and harnessing innovative approaches, we can chart a path forward that not only overcomes our challenges but also ensures the sustainable growth and prosperity of the entire sugar industry.

There is a need to embrace the opportunity to learn, collaborate, and innovate to pave way for a more resilient and thriving sugarcane industry in the face of diverse challenges across our varied landscapes.”



WILLIS AUDI

Director General, Agriculture and Food Authority (AFA)

“The issues discussed here are crucial for the development of the sugar industry in our country when we aim to implement them. We are currently in the process of putting into action most of the recommendations from the taskforce report, with the aim of benefiting all stakeholders in the sugar industry.

These symposiums serve as valuable platforms for sharing new information, including insights into the regulatory framework.



The sugar industry in Kenya has faced recurring challenges, leading to cyclic fluctuations. Despite our objective to achieve self-reliance, numerous obstacles have impeded the sector’s productivity. It is essential for farmers and millers to collaborate to support sugar production, potentially generating surpluses for export.

Presently, there is a global shortage in sugar supply, and relying on imports for domestic sugar needs could result in further increases in sugar prices. Consequently, it is crucial to take deliberate actions to enhance sugarcane production, capitalizing on new and improved varieties that mature early and have high sucrose content.

Following such events, valuable insights and ideas can be gained towards taking relevant actions for the growth of the sugar industry.”

JUDE CHESIRE, OGW

Director, Agriculture and Food Authority - Sugar Directorate

“I extend my heartfelt appreciation to all participants, researchers, industry leaders, and stakeholders who have convened to contribute to discussions on the future of our sugar industry.

The sugar sector holds a significant importance in our agricultural landscape, with sugarcane cultivation currently practised in 14 counties, primarily in Western, Nyanza, Rift Valley, and the coastal region.

There are plans in progress to expand sugarcane cultivation



to Tana River County. The sector serves as a major source of income for over 300,000 smallholder farmers and indirectly supports 8 million people.

Despite its vital role in our economy, the sugar sub-sector grapples with challenges that pose threats to its sustainability. Factors such as low factory efficiencies, underutilization of installed capacity, high production costs, and inadequate cane husbandry have resulted in insufficient sugar production, thereby impacting the overall productivity of the industry.

The industry is in the process of transitioning to Quality-Based Cane Payment System (QBCPS) from weight-based; an initiative aimed at boosting the industry productivity. Digitization of licensing, complaints handling, and the launch of the Miwa Bora App have significantly improved access to timely information and effective engagement with stakeholders. The Directorate remains steadfast in its commitment to fostering a future where the sugar sub-sector flourishes in the face of challenges, ensuring prosperity for industry stakeholders and contributing to the overall economic growth of the nation.”

KEYNOTE ADDRESSES

HON. DR. JOHN MUTUNGA, MP - TIGANIA WEST Chair, Parliamentary Agriculture and Livestock Committee



The Agriculture sector holds immense potential to transform our country's economy. Given that trade is a major source of foreign currency, limited agricultural output translates to reduced value in international markets. Neglecting agriculture hinders our nation's growth potential. To address this, we must prioritise the agricultural sector at the county level, recognizing its devolved nature. However, Agricultural financing remains a significant concern in our country despite the sector's crucial role. The Parliamentary Agriculture Committee has

the responsibility of allocating funds to the agriculture sector, determining where these funds are directed, and advocating for increased support. There are legislative efforts underway to address the challenges facing the Sugar Industry.

To effectively advocate for increased funding, we need a comprehensive understanding of the sector's dynamics. Agriculture constitutes a significant portion of the country's GDP, making it the backbone of our economy. In this symposium, as we explore various technologies and innovations, let us embrace them to ensure the sustainability of the agriculture sector. By doing so, we can build a solid foundation for petitioning for more funds to provide essential support for agriculture.”

CLIMATE CHANGE RESILIENCE AND MITIGATION

Speaker - Shadrack Agaki,

Panelists - Judith Libaisi & Obed Ogega



In contextualising climate change within the sugar sub-sector, a comprehensive approach involves not just identifying stakeholders and policy development but also an inclusive understanding of the multifaceted challenges. Effective coordination among diverse policies stands as a key hurdle. Alignment and synergy between these policies are imperative to tackle the shared challenges across the industry. The spectrum of climate impacts, from extreme weather events like droughts, floods, to heat stress, affect all aspects of the sugar of the sugar value chain, emphasising the necessity for a collective effort to navigate these challenges.

Sugarcane farmers, pivotal in the sector's sustainable evolution, hold significant potential in the fight against climate change. Encouraging their adoption of regenerative agriculture practices

not only promises improved productivity but also bolsters resilience against climatic fluctuations. To fortify climate resilience, strategies like developing efficient irrigation systems and fostering diversity within the sugar industry are critical. Moreover, refining governance structures to promote public engagement and participation can enhance policy effectiveness.

However, addressing climate change in agriculture requires substantial resources. Empowering farmers through financial

support and introducing mechanisms like agricultural insurance can enable them to implement and sustain adaptation strategies effectively. Collaboration between policymakers and researchers is paramount to align efforts and objectives, ensuring that climate-smart agriculture practices are not just conceptual but implementable, directly benefiting the farmers and the entire sugar industry.



MODERN MILLING TECHNOLOGIES TO MINIMISE WASTAGE

Speaker - Eng. Patrick Mugenya



There are seven critical stages involved in producing raw sugar that encompass cane harvesting and transportation, juice extraction, purification, evaporation, crystallisation, centrifugation, and storage of sugar and molasses.

Identifying potential points of losses in the manufacturing process involves trouble shooting in various areas such as sugar losses, steam and power consumption, water usage, manpower deployment, time efficiency and the utilisation of byproducts.

Modern milling technologies for waste minimization in the sugar process encompass equipment upgrades, automation, new designs, real-time analytical systems, performance evaluation systems and computerised technologies.

Enhancement of conventional mills by increasing the number of roller millers from 3 to 4 or more, minimises wastage, increases mill extraction while also being a cost-effective alternative to installing entirely new mills.

The industry should adopt Innovative Coupling Solutions such as rope coupling over the conventional tail bar and box coupling. This alternative coupling method reduces frictional and torque losses, improves the extraction performance of the mills and lowers power consumption.

There are opportunities for automation in cane feed control, mill speed control, boiler operation control, and process controls, including temperature, pH, and chemical dosing. Automation in these areas could lead to increased efficiency and reduced wastage.

ADOPTION OF MECHANISATION TO IMPROVE EFFICIENCY

Speaker - Eng. Richard Kanui

Sugarcane, being a substantial industrial crop, requires mechanisation at every stage, from farming and transportation to manufacturing. There is a need for significant investment in mechanisation throughout the entire value chain. Statistics indicate that the current mechanisation levels in the country stand at 30%, falling short of the targeted 50%.

Drawing inspiration from successful models in other agricultural sub-sectors, the sugar sub-sector should adopt a cooperative model approach. The rice sub-sector is an example, where farmers have organised themselves into groups and receive government-subsidised farm machinery. This collaborative



approach could significantly contribute to overcoming the challenges in achieving the mechanisation target.

Mechanisation not only enhances productivity but also substantially reduces production costs. Mechanisation creates opportunities for skilled manpower, particularly as machine operators thereby demystifying the perception of it leading to job losses.

In a forward-looking approach, a circular model of operation within the sugar sub-sector should be adopted.

LEVERAGING DIGITAL INNOVATIONS FOR SUSTAINABILITY

Speaker - Wangoru Kihara,

Panelist - Nick Kwolek



The role of digital technologies in the sugarcane value chain is expansive, ranging from precision farming to sustainable processing and market access. Sensors, drones, and data analytics contribute to precision agriculture in sugarcane farming. Farmers can monitor and manage factors like soil health, irrigation, and pest control more precisely, optimising resource usage and increasing crop yield.

Digital traceability systems, IoT enabled devices and data analytics can be employed to track sugarcane from the farm to the final product to ensure transparency, ethical sourcing, and quality control throughout the supply chain, optimising irrigation and harvesting practices by providing real-time information on soil moisture levels, weather conditions and providing real-time data on crop maturity and field conditions, allowing for

optimised harvesting schedules. Digital technologies, including energy monitoring systems and cogeneration practices, contribute to making sugar processing facilities more energy-efficient. Improved efficiency in sugarcane cultivation leading to higher yields and reduced environmental impact, building consumer trust through transparent and traceable supply chains, meeting ethical and sustainability standards, efficient water usage, reduced environmental impact, and improved crop health and reduced carbon footprint, cost savings, and meeting sustainability goals



are some of the opportunities that are open to sugar industry through leveraging on existing digital innovations. While these technologies offer numerous opportunities, challenges include initial costs, the need for infrastructure, and ensuring that benefits are distributed equitably across the value chain.

SUGAR VALUE CHAIN FINANCING

Speaker - Kefa Michael Gitau,

Panelist - Lorna Masila



companies have the necessary funds for operational expenses, cane development, and inventory management. Additionally, risk management with derivatives, such as futures and options, helps sugar producers hedge against price volatility in sugar and related commodities, mitigating uncertainties linked to fluctuating sugarcane prices.

The issuance of green and sustainable bonds is a response to the growing emphasis on sustainability within the sugar industry. Sugar companies can use these bonds to finance environmentally friendly projects, including investments in energy-efficient technologies, waste reduction, and sustainable agricultural practices. This not only aligns with

sustainability goals but also attracts socially responsible investors seeking opportunities to support eco-friendly initiatives.

Infrastructure financing for ethanol production is another area where capital markets play a crucial role. Capital markets can provide the necessary long-term investment commitments to finance the establishment or expansion of ethanol production facilities within the sugar value chain.

Debt financing for small and medium enterprises (SMEs), including sugarcane farmers, enables them to access funds for investments in modern farming practices, equipment, and technology. Capital markets contribute by designing financial instruments that cater to the specific needs and capacities of these entities, promoting accessibility to financing.

The role of capital markets in the sugar value chain is pivotal for the industry's development and sustainability. Corporate financing for sugar companies involves significant capital investment in land, machinery, and technology. Capital markets offer a platform for raising funds through debt or equity instruments, allowing sugar companies to finance expansion, modernization, and technological upgrades. This can be achieved by issuing bonds or going public through initial public offerings (IPOs), with careful consideration of financing terms, interest rates, and repayment structures.

Working capital financing is crucial in navigating the cash flow fluctuations during different phases of sugar production. Efficient management, facilitated by capital markets, ensures that sugar



IMPROVING VALUE FOR THE SMALLHOLDER SUGARCANE FARMER

Panel Lead - Dr. Chrispine Omondi,

Panelists - Simon Wesechere, Catherine Riungu, Andrew Bett



Smallholder farmers are the backbone of Kenya's sugar industry, contributing a substantial 94% of the total sugarcane milled.

Despite their pivotal role, they often find themselves marginalised within the sugar value chain.

Their significance in providing raw materials contrasts sharply with the lack of attention and support they receive. To secure the industry's sustainability, it's imperative to prioritise the welfare of these farmers.

One crucial step involves ensuring that farmers are safeguarded through contracts that offer insurance and fair compensation for their delivered sugarcane. Motivating them through improved payments can significantly elevate their

enthusiasm and dedication to the industry. Additionally, enhancing accessibility to advanced, high-yielding sugarcane varieties that mature early can substantially amplify productivity, translating to better returns for these farmers.

Furthermore, the formulation and implementation of appropriate policies are essential. These policies should guarantee that smallholder sugarcane farmers are direct beneficiaries of the various products derived from sugarcane processing. Empowering

these farmers not only ensures their prosperity but also fortifies the entire sugarcane industry, fostering a more equitable and sustainable ecosystem.



UNLOCKING SOIL POTENTIAL FOR IMPROVED SUGARCANE PRODUCTIVITY

Speaker - Dr. Martin Oulu - GIZ

Over the past few years, the sugar industry has faced a concerning trend where cultivation area for sugarcane has expanded while productivity has shown a steady decline. This decline is primarily linked to the deteriorating quality and health of soils within sugarcane-growing regions.

The exhaustive impact of prolonged, uninterrupted cultivation, coupled with minimal soil management strategies, has led to the depletion of essential nutrients in these soils. Continuous cropping without adequate replenishment has taken a toll on soil fertility, significantly affecting sugarcane yields.

Addressing these challenges necessitates a shift towards conservation



farming practices within the industry. Implementing such methods can mitigate soil degradation and revitalise its health by employing techniques like crop rotation, cover cropping, and organic matter incorporation. These practices foster soil biodiversity, enhance nutrient retention, and minimise erosion, fostering sustainable agricultural ecosystems.

Furthermore, advocating for and adopting these approaches can not only revive soil fertility but also ensure the long-term viability and prosperity of the sugarcane industry.

INNOVATION PRESENTATIONS

VICTOR MASINDE

DEMOCRATISING CAPITAL IN THE SUGARCANE VALUE CHAIN

The innovation focused on developing data-driven solutions to boost productivity, profitability and food security across smallholder farming communities. The mobile platform aims to “” financial access.

Through innovative credit scoring models that are built to be human-centred and tailored to respond to the needs of smallholder sugarcane farmers, with the aim of unlocking new opportunities for vital yet underserved groups to access the affordable capital required to transform rural livelihoods and local economies within the sugar value chain.





STAN EARL & TEAM

SUGAR DATA COLLECTION MONITORING SYSTEM



The Sugar Data Collection Monitoring System is an innovation designed to revolutionise the sugar production ecosystem by providing real-time monitoring solutions across the entire value chain – from farms to mills.

This innovation is strategically engineered to enhance efficiency, transparency, and environmental sustainability throughout the sugar production process.

The system offers a comprehensive and integrated approach to monitor and optimise the entire production process; leveraging advanced technologies and emphasising efficiency, transparency, and environmental sustainability, this innovation paves the way for a more resilient and competitive sugar industry.



AYOO LIZA ATIENO

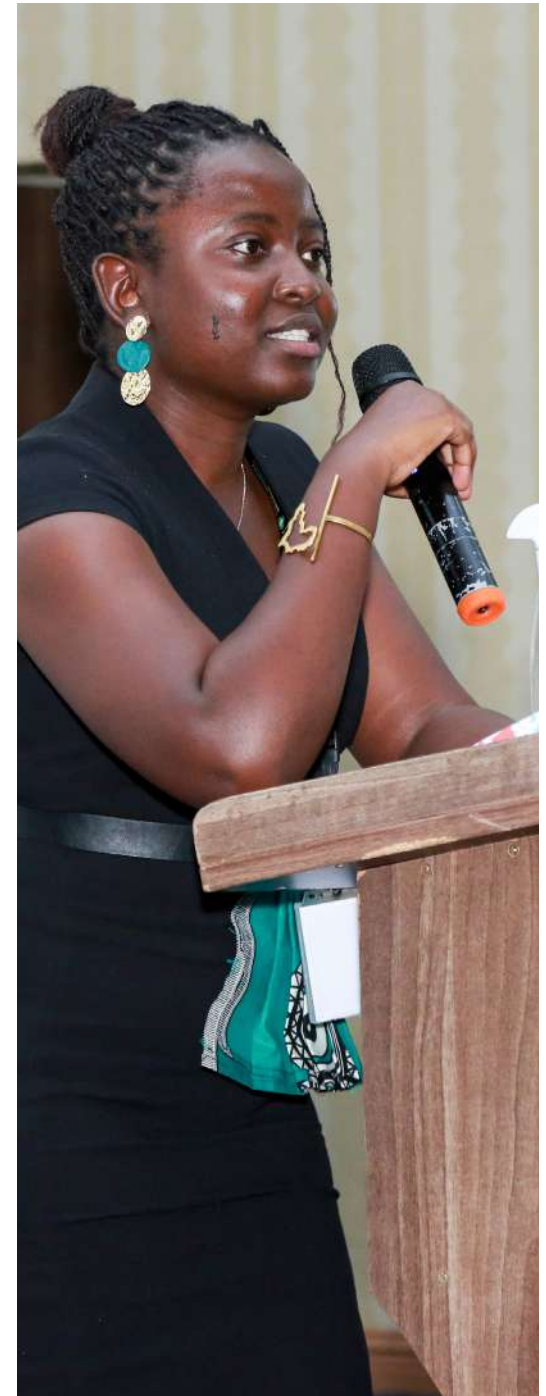
ADOPTING GIS AND RS FOR SUSTAINABLE GROWTH

This system aims to provide accurate, real-time information for informed decision-making, ultimately promoting the sustainability and competitiveness of the sugar industry.

The system envisions promoting the industry's efficiency and viability by undertaking; Data collection, and integrating a farmer ID system for data accuracy, creating a centralised sugar database, upgrading existing datasets, and developing a web portal for data input, analytics, monitoring, and reporting.

This system aims to digitize sugarcane fields using drones, satellite imagery and ArcGIS software creating one of Kenya's largest agricultural geo-datasets. The system will also integrate automated weather stations at strategic locations within the Sugar Belt to provide real-time weather data.

The cane farms database and farmer ID database will be integrated into a unified big data system accessible to industry stakeholders.





WINNER



VICTOR MASINDE

Cash Prize

KSh. 250,000





FIRST RUNNER UP

STAN EARL & TEAM

Cash Prize

KSh. 100,000



SECOND RUNNER UP

AYOO LIZA ATIENO

Cash Prize

KSh. 50,000





LEVERAGING TECHNOLOGY TO IMPROVE THE EAST AFRICAN SUGAR VALUE CHAIN Gold Sponsor Remarks - Kulea

Nick Kwolek, the founder and CEO of Kulea Africa, a leading provider of digital solutions for the agricultural sector in East Africa and a proud Gold Sponsor, took the stage to unveil groundbreaking insights on Leveraging Technology in the East African Sugar Value Chain.

In his keynote address, he shared how Kulea, Africa's Commodity Intelligence Platform, provides deep technical and trading insights into the opaque multi-commodity market in the African continent. The Platform, being a trusted source for sugar expertise in Africa and beyond, equips buyers and sellers with invaluable insights, expert analysis, and strategic guidance. Helping traders stay ahead of market trends, minimize losses, and optimize profits with confidence.

Nick Kwolek concluded his speech by inviting the audience to visit the Kulea Africa booth at the exhibition hall, where they can see live demonstrations of these innovative solutions and learn more about how they can partner with Kulea Africa to revolutionize the sugar value chain in East Africa.





SYMPOSIUM RESOLUTIONS

The main outcome of the symposium was a “joint call for action”, which covers the main recommendations emerging from presentations, panel discussions and innovation presentations.

These resolutions underscores a resolute commitment to a collaborative approach among industry stakeholders, urging them to unite in implementing innovative solutions to address the challenges plaguing the Sugar Industry.

Steps moving forward, include:

1. Prioritize initiatives that enhance the value for smallholder sugarcane farmers by implementing targeted support programs, providing access to advanced agricultural practices, and fostering collaborations to strengthen their economic resilience.
2. Exploring and implementing sustainable soil management practices, research, and technologies to unlock the full potential of soil for improved sugarcane productivity, ensuring long-term environmental and economic benefits.
3. Embrace and invest in modern milling technologies aimed at minimizing sugarcane processing wastage, optimizing resource utilization, and improving overall efficiency in sugar production processes.

4. Encourage and facilitate the adoption of modern mechanization techniques to streamline operations and increase productivity.
5. Collaborate with financial institutions, governments, and stakeholders to develop and implement innovative financing models that support sustainability and growth throughout the entire value chain.
6. Embrace and leverage digital innovations across the sugar industry to enhance sustainability, improve transparency, and optimize resource management. This includes the implementation of digital tools and technologies to monitor and manage various aspects of sugarcane farming and processing.
7. Develop and implement strategies for climate change resilience and mitigation. This includes investing in research, adopting sustainable practices, and promoting environmental stewardship throughout the entire sugar value chain.



EXHIBITORS

- Kulea Africa
- Joopers Juices
- Start Somewhere Limited
- Equity Bank
- Kibos and Allied Sugar
- Agricultural Finance Corporation
- KALRO - Sugar Research Institute
- Yara Fertilizers
- CMC Motors







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