KeSEBAE NEWS

Newsletter of the Kenya Society of Environmental, Biological and Agricultural Engineers

VOLUME 5. NO. 6 8 AUGUST 2023

DEAR READER

Welcome to KeSEBAE Newsletter.

A fortnightly Newsletter touching on topical issues affecting our environment.

KeSEBAE NEWS is a Newsletter of the Kenya Society of Environmental, Biological and Agricultural Engineers (KeSEBAE)

Inside this Issue!

About the Conference

The annual international conference for 2023, organized by the Kenya Society of Environmental, Biological and Agricultural Engineers (KeSEBAE) in collaboration with the Pan African Society for Agricultural Engineering (PASAE), is set to take place from Wednesday 6th to Friday 8th December 2023. The conference will revolve around the theme of "Engineering Agenda 2063: The Africa We Want."

Sub- Themes

i. Seamless Connections (Roads, Railways, Air Transport)

ii. Energy for Africa

iii. Industrialized Agriculture

iv. Housing

v. Free Trade in Services

vi. Security

vii. Sustainable Environment

viii. Engineering Education and Practice

Paper Submission

The conference avails an international platform for presentation of new advances and findings in diverse engineering fields. We therefore appeal to members to submit their papers. We encourage you to invite colleagues to participate in the conference and submit papers for the Conference Call for Papers.

Please submit your papers to events@kesebae.or.ke.

Key Dates:

Abstract Submission: 11 September 2023

Paper Submission: 10 October 2023

Payment Deadline: 25 October 2023

Registration Details

Members: KES 15,000($150)

Non-Members: KES 20,000($200)

Undergraduate Students: KES 2,000($20)

Field Visit: KES 5,000($50)

Virtual: KES 10,000($100)

Registration Links

KeSEBAE Website: www.kesebae.or.ke

Web Link: https://kesebae.or.ke/about-us/events/conference-2023/

PASAE: www. pasae.org.za

Contact Details

Call: 0788712156

Email: info@kesebae.or.ke

Web: www.kesebae.or.ke

Everyone knows well that the Imperial British East Africa Company (IBEA) was granted a charter in 1888, which led to the colonization of the present-day Kenya. IBEA was transformed to the East Africa protectorate, then to the British Crown colony and then to the British colony. This history is important to mention because it is strongly linked to the colony agricultural and environmental matters. Precolonial and colonial periods, the indigenous communities were strong in their cultures, settlements, traditional food production systems, because the population was still small and the land available was sufficient for all purpose use. Similarly, waste management was not a challenge during the colonial period. Indigenous communities' population density increased overtime, which became an impediment to the land, environment and the colonial state.

Following the onset of colonialization, African agricultural systems were "modernized" to serve the needs of the colonial economy. The new modes of production also provisioned the local communities with their economic needs, albeit subordinate to those of the colonial government. Several of the colonial agricultural activities did not take into consideration environmental concerns, thus resulting to land degradation, where attributed to soil erosion and the related problem of decline in soil fertility were at the core of these concerns.

Although efforts were made to solving these environmental problems through the international exchange of agricultural and ecological information in the form of "agroecological internationalism, little progress was achieved. But later, this phase was followed by adoption of an integrated environmental management initiative focusing on soil conservation (1934-1938). The land and environment became a besieged environment (1939-1945) due to the emergence of several freedom political movement and an intensive agricultural system threatened the welfare of the land, as the colonial government policy shifted away from seeking permanent solutions to land degradation to a rigorous war-effort programmes. This scenario forced the need to revive the indigenous community traditions (1945-63).

The colonial land management was deliberate and in support to tightening its links to meet British economic recovery, which are frequently weakened by wars and resistances. This period also witnessed failed agricultural intensification. Problem of waste management in Kenya is always linked to high population, scarcity of land, and underdevelopment waste management infrastructure. Such problem was recurred from one government to another to the present. Although the government made efforts under the old county councils to collect and dispose the waste, but it failed to promote meaningful environmental development because of the policy contradictory and unsustainable approaches adopted for waste management. This is the reason why presently counties experience with environmental regulations are that of trial and error, often revealing a compelling and dismal trajectory regarding the government environmental intervention.

The sustainable waste management act no. 31 of 2022; waste regulation of 2006 and EMCA of 1999 comprehensively define the term waste and its different components. From these laws, the country is on the right footing. But calls for sound implementation of the laws and institutionalization, investing in proper waste treatment and management

infrastructure. The sustainable waste management act no. 31 of 2022 objective is to make our country a zero-waste country through enhanced resource recovery strategies, so that the country can sustainably achieve the constitutional provision on the right to a clean and healthy environment. From this Act, sustainable waste management means using material resources efficiently as prioritized by waste hierarchy, circular economy and clean production in order to reduce the amount of waste that is generated, deposited or discarded in the environment including the management of materials that would otherwise have been dumped or wasted in a way that contributes to environmental, social and economic goals of sustainable development. Therefore, desired waste management may be defined as the discipline associated with the control of generation, collection, storage, transfer and transport, processing and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations. I must congratulate NEMA, the Ministry and the government at large for making Kenya a global example where a single use plastic is prohibited. As a scholar, my fear is always that such excellent law will remain and die on the shelves.

Understanding What Constitute Municipal Wastes

To appreciate the understanding of what constitute municipal waste, I take the opportunity to can many literatures. In my simple findings, municipal waste can be seen as waste originating from domestic, commercial, institutional, administrative or packaging activities. It sometimes includes treated hazardous waste and waste from light industries. This definition totally excludes hazardous, industrial process waste, construction and demolition debris, offal, sludges, tires, and ashes. Municipal waste can be sometime called garbage, refuse, rubbish, and ash. However, definition of the municipal wastes keeps varying from one country to another, due to variation in culture, environmental perspective, nature of the problem and experiences. Generally, waste can be something which has value totally directly or indirectly. It's something that cannot be stolen by anyone.

Municipal waste can be organic or inorganic and can originate from household, city, commercial places, industrial places. In this article, both liquid and gaseous waste are excluded from this discussion for simplicity. Studies have shown that communities, countries and organizations have suffered from various environmental externalities and diseases associated with poor waste management practices. Many countries in Africa, including Kenya, are often confronted with the problem of open dumping of waste due to lack of knowledge, financial constraints, lack of political will to protect public health systems and underdeveloped waste engineering infrastructure. Such practice has endangered agricultural land, water sources, settlements and sets in social conflicts. As a result, many counties in Kenya are struggling to find a place to establish a dumpsite.

Thanks to NEMA and other organizations that the public are now a wake and they are ready to tolerate a dumpsite behind their back. This limitation is already creating another crisis from governance, funding, and infrastructure perspective. Sustainable waste management as envisaged by Act no. 31 of

2022 has the potential to drive proper and effective waste management system, capable of transforming both the society and ecological integrity. I must congratulate H.E Uhuru Kenyatta government for giving proper attention, priority and urgency to this subject that we finally have a supreme waste management law. This is because proper waste management is today a necessity rather than a luxury.

The problem of waste generation and composition

The country is experiencing population, entrepreneurship and urbanization explosion. We are also basically an importing country, which comes with a diversity of waste. Although, we have excellent laws, the waste management problems will be far from over. For whatever reasons, to get any county waste generation and compositional data is an uphill task, save scanty, and old data for Nairobi, Mombasa and Kisumu cities. Without robust waste data, it will be difficult to plan, design and deliver any waste management functional system. Waste data is a useful tool for planning, budgeting, human resource determination, equipment type, and waste management options. The problem of inadequate waste management has endangered ecological quality of our rivers, streams, public spaces and settlements. There is need to make waste generation and compositional studies by counties effective and a mandatory by the national government. Such policy measures are beneficiary to the climate change resilience building and waste circular economy. Improved waste collection and disposal rates have been recorded for Nairobi at 60%, Nakuru 45%, Kisumu 20% and Thika 60% according to the National Environment Complaint Committee (2021). Although, it can be easily said that waste collection and disposal has improved, but many households in the low- and poor-income areas have difficult in accessing such service, due to the limitation by income, inaccessible environment and other factors.

Table below shows wastes generation characterization by percent composition according to study done by UN-Habitat 2019 and JICA 2010.

Description	UN-Habitat 2019	JICA 2010
1. Kitchen	54.8%	
2. Garden/park	0.5%	
3. Wood	1.7%	62%
4. Paper/card	11.8%	14%
5. Plastic-film	4.3%	
6. Plastic-dense	11.0%	10.9%
7. Metals	2.2%	0.7%
8. Glass	4.6%	1.5%
9. Textile/shoes	3.3%	
10. WEEE	1.4%	
11. HHW	0.3%	
12. Other	4.0%	10.5%

(Extracted from the Ministry of Environment and Forestry Report on the Waste Management, Extent and Impact of Leachate Pollution in Western Kenya of 2022)

From the above table, there is a great opportunity to improve waste management practice through improved household knowledge, provision of engineered waste storage and collection infrastructure that are designed and interconnected systems for enhanced waste circular economy. What this implies is that with available infrastructure, sensitized stakeholders, and improved policy enforcements, all waste produced can be diverted through strategic channels, options and systems. Therefore, what get disposed on the land, are the waste that cannot be reused, recycled, or reengineered. As a country, we are always blessed with all these opportunities. Hence, the vision of zero waste country as envisaged by sustainable waste management Act no. 31 of 2022 is possible.

On 19th July 2023, I took a walk from Olekasasi Trading Centre to Ongata Rongai, where I practically witnessed waste dumping in the Maasai lodge river. This river drains to the Athi river. I had an opportunity to take photos with my phone as shown below.

Kenya counties are experiencing difficulties in managing waste dumpsites as some of the dumpsites were established before EMCA 1999. When I got opportunity to visit some dumpsites, I found that they lack management office, equipment, technical personnel, leachate and gas management provisions, fence and security. Nearly, all the dumpsites are either located in low- and poor-income settlements, quarry sites, farming areas, and or near rivers. Such conditions present potential risks of pollution of water sources and agricultural land. Proper dumpsite management can be utilized to promote waste

characterization and compositional studies, training and ecological restoration science and technologies.

Why such problem is happening at the backyard of the poor households are that they have no option for waste management. Most of the waste thrown here are the baby diapers, menstrual waste and other normal household waste. In my humble opinion, this poor and low-income household cannot afford waste collection and disposal services and hence, it is advisable that the county government to consider exploring option of communal collection containers, which can be towered once full. Such can work extremely well in the informal settlements, low- and poor-income areas. I have seen it practically seen such system in Malaysia and Pakistan. Such practical intervention can save our rivers, environment, biodiversity and human health. Small positive actions to protect our environment and public health systems are always beautiful and beneficial to humanity.

Challenges Facing Municipal Waste Management in Kenya

Waste management sector in Kenya is highly characterized by the following bottlenecks, which includes:

- Inadequate awareness, knowledge and participation leading to poor attitudes and behaviours towards waste management.
- High poverty level especially in informal and low-income settlements has compromised the ability to pay for waste management services.
- Absence of scientific data on waste generation and composition data.
- Unplanned development patterns coupled with increased population.
- Inadequate waste management infrastructure (storage, transportation, transfer station, sanitary landfill, waste separation, waste conversion technologies and treatments, inadequate technical competencies, etc.).
- Disposal sites overfilling quickly, lack of land for siting and management of dumpsites.
- Institutional inadequacies (finance, human capital, data and equipment, policy and regulations enforcement).
- Use of inappropriate collection vehicles that lack of modernization and technological options.

Waste generation and Management Trends and future directions for Engineering Research and Innovations

The World Bank's Atlas of Sustainable Development Goals 2023, which was reported on by The Star Newspaper on July 20, 2023, stated that the estimated amount of waste produced in Kenya by 41.3 million Kenyans in 2020 was 5.59 million tonnes, or the equivalent of 135 kilograms per person. With a population of more than 50 million, the county's waste production is expected to rise even more, reaching 6.9 and 9.8 million tonnes in 2030 and 2050, respectively.

If as a nation we fail to prioritize waste management sector, this scenario will create a huge difficulty with expanding population, unplanned urbanization, and demand for additional waste funding. If universities are at the forefront of waste research innovations, engineers are at the forefront of waste system designs and development, the public is committed to waste segregation practices, counties are providing the necessary waste infrastructure at all levels, industries

are well supplied with recyclables, civic societies are educating the public and stakeholders, and policymakers are committed to excellent oversight roles, then all of these factors could mean effective waste segregation.

The country and counties need to invest in waste management capacity development, waste management research, institutional arrangements, and capacity strengthening. The governments also need to promote a paradigm shift where waste management can be viewed as an envirobusiness and see poor waste management as a society problem rather than a government problem (desire for shared responsibilities). This is necessary because projected waste generation is expected to increase over time, demanding more land, and resources. To fulfill the nation's goals for sustainable waste management, it is also vital to establish the roles of NEMA, the waste management council, the county governments, and the national government. Keeping in mind that every citizen has a right to a clean and healthy environment under our constitution.

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Association of Consulting Engineers of Kenya
ACEK 2023 CONFERENCE
Engineering Food Security
Eldoret, Kenya
16th - 18th October 2023
20 PDUs
DELEGATES | Early Bird Tickets Up to 16th Sep | Late Registration From 17th Sep
ACEK Members | KES 20,000 | KES 25,000
Kenya and EA Delegates | KES 25,000 | KES 30,000
International Delegates | USD 300 | USD 350
Future Leaders | KES 15,000 | KES 15,000
Virtual Delegates | KES 10,000 | KES 12,500
BANK PAYMENT MODE
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Call for Papers

To the Next Editions of the JEAE

JEAE

Journal of Engineering in Agriculture and the Environment

The Journal of Engineering in Agriculture and the Environment (JEAE) is a Publication of the Kenya Society of Environmental, Biological and Agricultural Engineers (KeSEBAE) through which researchers in the fields of Environment, Agriculture and related fields share research information and findings with their peers from around the globe.

The JEAE Editorial Board wishes to invite interested researchers with complete work in any relevant topic, to submit their papers for publication in the next editions of the Journal.

Manuscripts may be submitted online or via email to:

Prof. Lawrence Gumbe, Chairperson, JEAE Editorial Board
Via Email: info@kesebae.or.ke or online via: https://www.kesebae.or.ke/journal/manuscript_submit.php

Criteria for Article Selection

Priority in the selection of articles for publication is that the articles:

a. Are written in the English language
b. Are relevant to the application of engineering and technology in agriculture, the environment and biological systems
c. Have not been previously published elsewhere, or, if previously published are supported by a copyright permission
d. Deals with theoretical, practical and adoptable innovations applicable to engineering and technology in agriculture, the environment and biological systems
e. Have a 150 to250 words abstract, preceding the main body of the article
f. The abstract should be followed by the list of 4 to 8 "Key Words"
g. Manuscript should be single-spaced, under 4,000 words (approximately equivalent to 5-6 pages of A4-size paper)
h. Should be submitted in both MS word (2010 or later versions) and pdf formats (i.e., authors submit the abstract and key words in MS Word and pdf after which author uploads the entire manuscript in MS word and pdf)
i. Are supported by authentic sources, references or bibliography

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CALL FOR ARTICLES TO KeSEBAE NEWS

KeSEBAE NEWS Editorial wishes to call for topical articles for publication in future editions of KeSEBAE NEWS.

Please transmit the same to the **Editor: Ezekiel Oranga** via Email: info@kesebae.or.ke

NOTE: A payment will be made to the author of each selected article

CALL FOR MEMBERSHIP

Be a KeSEBAE Member:

The annual subscription fees, admission fees and reinstatement fees for members of all grades (except Honorary and Life Members who shall pay no dues or fees) are indicated below: The annual dues are as follows:

Membership Category	Annual Subscription (KES)	Admission Fees (KES)	Reinstatement Fees (KES)
Fellow	5,000	1,000	2,000
Member	2,000	1,000	2,000
Ass.Member	1,000	1,000	2,000
Aff.Member	500	1,000	2,000
Student	300	100	-

Membership Renewal

Members of all grades are requested to renew their **2022 membership as follows.**

Membership Category	*Annual Subscription Fee (KES)*
Fellow	**5,000**
Member	**2,000**
Ass. Member	**1,000**
Aff. Member	**500**
Student Member	**300**

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Branch	**Nairobi University Express Branch**
Account Name	**Kenya Society of Env. Bio. & Agric. Engineers**
Account No.	**2038150696**
Swift Code	**BARCKENX**
Currency	**Kenya Shillings**

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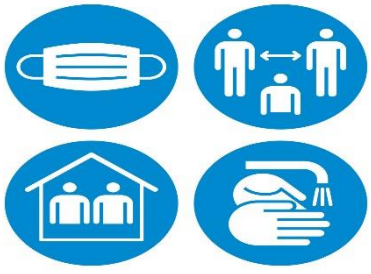
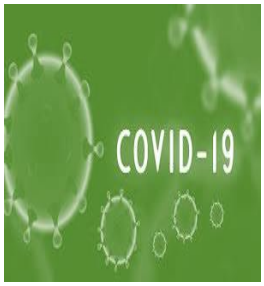
Account No: **Your Full Name**





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