

# CLIMATE RESILIENCE AND WASTE MANAGEMENT FOR SUSTAINABLE DEVELOPMENT (CReWAS) CONFERENCE

October 16-17, 2019  
INTERNATIONAL HOUSE, UNIVERSITY OF GHANA

## CONFERENCE REPORT



INSTITUTE FOR ENVIRONMENT  
AND SANITATION STUDIES (IESS)



COLLABORATORS



WORLDWIDE UNIVERSITIES NETWORK



UNIVERSITY  
*of York*



UNITED NATIONS  
UNIVERSITY  
UNU-MERIT



## CREWAS CONFERENCE 2019 IN NUMBERS



ABOUT 150 PARTICIPANTS

↳ 5 COUNTRIES

↳ 3 PANELS

↳ 28 PRESENTATIONS

↳ EXHIBITIONS

# The opening plenary



Master of Programme:  
Dr. B. D. Ofori, Senior  
Research Fellow- IEss

## The opening session featured:

- A welcome and opening remarks by the Director of the Institute, Prof. Kwasi Appeneing Addo,
- An overview of the CReWAS Conference by Senior Research Fellow and Chairman of the organising Committee, Dr. Daniel Nukpezah,
- Remarks by Provost of the College of Basic and Applied Sciences (CBAS), Prof. Daniel Asiedu
- A keynote address by Hon. Dr. Emmanuel Lampetey, the Municipal Chief Executive (MCE), Ga Central

It gave me a lot of new ideas, and especially what I found this year was the variety of viewpoints ... there was personalised learning, corporate learning, and people speaking on new philosophies: it was this combination and variety of subjects that I found really interesting."

## Welcome and Opening Address, Prof. Kwasi Appeaning Addo (Director, IESS)



The impact of climate change and improper Municipal Solid Waste (MSW) management on the environment, the need to build strong and resilient coastal zones, ensure effective management of waste, efficient use of resources has attracted attention from local and international scholars, policymakers, government and industry.

The conference seeks to bring together experienced researchers, academics, policymakers, private sector and civil society to discuss and share ideas.

IESS organized the CReWAS Conference in collaboration with Worldwide Universities Network (WUN)

## Conference Overview, Dr. Dan Nukpezah (Senior Research Fellow, IESS)



The conference features a multi-stakeholder forum organized by UNU-MERIT under the aegis of WUN on the theme "A Cross-National Study of Urban Solid Waste Management: Learning and Way Forward".

There will be:

- A keynote address and a panel discussion on the topic: "the climate-sanitation challenge: is the circular economy a panacea for sustainable development"?
- Research papers and
- Poster with Exhibitions held in parallel

The conference will further provide a platform for seasoned and young scholars as well as entrepreneurs to present relevant research work and sustainable business models

### **Remarks, Prof. Daniel Asiedu (Provost, CBAS)**



The CReWAS conference marks another opportunity to highlight the many challenges confronting humanity and to bring together researchers, academics, policymakers, private practitioners and civil society to exchange ideas on the way to address these challenges as we strive towards sustainable development.

Unsustainable levels of resource use, unfriendly technologies, and unsustainable consumption are having impacts on the environment. Addressing these challenges requires better policies and action programmes that target specific individuals and multiple problems.

Though academic programmes are organized along disciplinary lines, there is a growing need for teamwork and collaboration, not only among researchers but also among practitioners, policy makers, private sector and civil society in order to understand the complexities and design appropriate actions and interventions.

It is in this respect that I find this conference useful. CBAS is not only supporting and driving the research agenda of the University but also forging partnership with government, industry and private sector so we make good use of research results. Not long ago IEES produced the state of the environment report in 2016. The institute is also one of the vice chancellor's green project; one of the action programs is the UG plastic recycling project, a student-led program.

IESS is also forging partnerships with industry and private sector for research uptake.

On this note, I wish you all a fruitful conference.

### **Keynote, Hon. Dr. E Lamptey (MCE, Ga Central**



It is my singular honour and pleasant duty to present the keynote address on a topic that is so important to local government, policymakers and also dear to His Excellency, the president of the republic of Ghana, Nana Akufo-Addo when he made a statement in 2014 to make Accra the cleanest city in Africa.

Mr. Chairperson, permit my biasness to accentuate my presentation on solid waste management (SWM).

The issue of SWM are not only local but global in nature. It is therefore everyone's business. Proper and effective SWM is critical to the achievement of the UN-SDGs. Conversely, improper SWM does not only affect human health but also the environment and creates climate change issues.

SWM is increasingly challenging and due in great part to rapid urbanization, increasing population, equating to a surge in waste generation threatening sustainable development especially in cities.

There is therefore urgent need for sustainable solutions for SWM that are technically and economically viable for both the state, and also the private sector. The way forward is quite daunting

A new form of waste collection and treatment is urgently needed.

Future SWM strategies should envisage a city where no waste exists, where the waste from one system is minimised and become feedstock for another system.

There should be a transition to become zero waste smart city. This vision would however require three strategies;

1. Waste prevention
2. Proper waste management
3. Proper value recovery from waste

## **Panel Discussion- C**haired by Sustainable business Professional, Mr. Venan A. Sondo, the

Panel discussion session brought to bear the experiences of three experts from diverse fields to discuss the topic “The Climate-Sanitation Challenge: Is Circular Economy a panacea for Sustainable Development?”

The speakers addressed topics that include;

- Climate change,
- Waste management and the
- Circular economy,
- Sustainability and
- Entrepreneurship



**Mr. Venan Sondo- Moderator**



**Dr. Josiane Nikiema (International Water Management Institute)**

### **What is your feedback on our transition towards the circular economy?**

When we talk about circular economy, i. e. materials going in and going round, but actually we need to think more of a spiral economy. An economy where materials go in and because value is being added, the economy is growing. This is because population is not static so more needs to be done with the initial resources that we have to feed and support the growing population in cities.

Also, for example, if there is a blockage in the system, it requires more energy to keep it going- and that is waste. If we can remove the waste and inefficiencies from the system, the economy would run much faster.

But that is not the problem. The problem is when someone steps on that pipeline to stop the material flowing and that is where policy makers come in. Policy makers can correct the situation.

If good policies aimed at empowering the environment are targeted at changing attitudes and behaviours, a lot of the issues associated with inefficiencies would be solved-

**Prof. Chris Gordon**

### **Is zero waste possible?**

Waste segregation at source can help us approach zero waste if not reach it.

Because, then, the separated waste streams can be recycled into other products.

The challenges on achieving the zero waste concept would be first to segregate waste.

Also, just having materials does not always mean it would make financial sense to process and convert it. You need to be able to attain the waste in sufficient volumes. So we need to keep in mind the financial aspect of it.

There is the need to ensure sustainability. This is one of the major challenges of the waste management system.

# Panel Discussion- "The Climate-Sanitation Challenge: Is Circular Economy a panacea for Sustainable Development?"



**Ing. I. B. Nartey-Tokoli (Jekora Ventures)**

**What is your advice on how upcoming entrepreneurs can leverage on in the waste and sanitation arena?**

We must all agree that waste is a misnomer, that every waste material has some uses.

From the engineering perspective, ignorance about specific properties of materials may lead people to think they have no use.

Also, students, there is lots of opportunities in material science, knowing the characteristics of materials would put you in a pedestal.

Knowing the technologies available would add value to what you want to produce.

On an entrepreneurial side, one needs to be ready to take calculated risks.



**Prof. Chris Gordon (IESS, UG)**

**In your view, what should be the policy direction in terms of our current challenges?**

Ghana has no shortage of policies. Actually we have some of the best policies globally. What we need is harmonization of policies.

We need people who can understand the true implications of the implementation of the policies.

Universities need to start training a different type of graduates, 'T' shaped. They should have an in-depth knowledge in an area and a broad understanding of many things.

**Dr. Josiane Nikiema**

**Where do you see research direction?**

Gaps in the research needs to be addressed. For instance, possible impacts of certain products recycled from waste.

To inform policy, policies must be solid and grounded on empirical facts and not based on unproven theories.

Research is needed in terms of technologies suitable for our climatic conditions, the type of waste materials we are treating.

**Ing. I. B. Nartey-Tokoli**

**Where do you see the direction of technology?**

We must adapt appropriate technology. Technologies must look at the models of the circular economy and try to develop along these lines.

# Parallel Sessions- Climate Change Adaptation and Resilience

**Presenter:** Emmanuel Okyere Yeboah

**Authors:** Ishmael Yaw Dadson, Nelson Yeboah Boanu, Emmanuel Okyere Yeboah, and Moses Tuu Bangfunuorteru

**Topic:** Tropical Climates and Thunderstorm: Perception among Ghanaians

**Purpose of study:** To identify people's views about lightning and thunderstorm and help educate people to blend science with traditional beliefs in order to ensure safety during thunderstorms.

**Study area and method:** Qualitative study in Winneba in the Central region of Ghana.

**Results:** People's understanding of lightning and thunder: An accompaniment of rain (39.4%), something that occurs naturally (15.3%), comes as a result of a curse (12.1%), atmospheric conditions (12.1%), signs of conditions occurring in heaven (9%) and smaller gods we worship (12.1%)

**Conclusion:** people's understanding of lightning and thunder is influenced by their tradition, religious, educational and family orientations. People adopt measures that are much more reliable in curtailing or protecting themselves from thunderstorm effects. Though, these measure may not be scientific in nature, they are still appropriate

**Recommendations:** Schools should educate children on what lightning and thunder actually are, Public education should be organized by NADMO through radio and TV stations where experts from the meteorological agencies would be invited to inform the citizenry on thunderstorms and adaptation strategies and encourage people to blend science with traditional beliefs in order to ensure safety measures during thunderstorms.

**Presenter:** precious Mattah

<sup>1\*</sup>  
**Authors:** Mattah<sup>3</sup>, P. A. D. Futagbi<sup>4</sup>, G. Amekudzi<sup>1</sup>, L. K. Mattah<sup>2</sup>, M. M

**Topic:** Climate variations, urban solid waste management and possible implications for *Anopheles* mosquito breeding in selected cities of coastal Ghana

**Purpose of study:** To explore how various future climate scenarios may affect *Anopheles* breeding in urban areas in the light of current waste management practices.

**Study area:** Sekondi-Takoradi and Accra Metropolitan Areas

**Results:** The study reveals a climate projection scenario where atmospheric temperature in the two urban areas of southern Ghana may increase by 1.7°C on the average

-Using regression equation, it was predicted that larval density may be increasing with corresponding margins of increase in temperature in the future over the two coastal cities.

-A future minimum temperature of 26°C may yield a projected larval density of 2.96 per 350 ml scoop.

-A future maximum projection of 31°C may yield a projected larval density of 8.41 per 350 ml scoop all things remain equal.

**Conclusion:** In both cities, the proportion of *Anopheles* larvae sampled followed the rainfall distribution pattern.

-Projecting into the future, greater part of the period between 2013 and 2050 would be wetter and hotter than the period, 1980 to 2012, in both cities.

-The duration of the minor rainy season will be widened starting from August instead of September to December instead of November.

-The ability of *Anopheles* mosquitoes to adapt and breed in all manner of water bodies may allow continuous presence of *Anopheles* mosquitoes in urban areas.

## Parallel Sessions- Waste Management

**Authored and presented by:** Julius-Jayson A. Botchway

**Topic:** Factors Affecting Source Segregation and Recycling Behaviours among Students of the University of Ghana

**Objective:** Find out the factors influencing source segregation and recycling behaviours, explore the relationship between inconvenience and source segregation and recycling behaviours and examine the impacts of rewards and punishments on source segregation and recycling behaviours among student residents of Mensah Sarbah Hall.

**Methodology and Study Area:** Survey design at Mensah Sarbah Hall, University of Ghana

**Result:** There is a negative correlation (-.2) between inconvenience of using the available facilities and source segregation behavior

-Females are more likely to segregate their water sachets than males. Mean= 3.28 : 4.41

-There is a positive correlation between knowledge about recycling and source segregation of water sachets. (r=.09)

-There is no relationship between reward & punishment and the behavior of segregating water sachets among students of Sarbah Hall

**Recommendation:** Convenient systems should be put in place for waste segregation

-More thorough efforts should be considered in creating awareness among males to segregate their waste

-Education over awareness creation is the best approach to get students to segregate their waste

Rewards and punishments not a trigger factor for students to segregate their waste

**Presenter:** Jesse S. Ayivor

**Topic:** Drivers of Environmental Change and Community Livelihoods in the Eastern Outlier Forest Zone of Ghana

**Authors:** Jesse S. Ayivor, Benjamin D Ofori, Frimpoma Baa-Poku

**Objective:** To find out the extent to which components of the environment have changed over time, the main drivers of change, effects on local livelihood and strategies local people put in to increase their resilience towards these changes.

**Study Area:** Likpe Lolobi and Santrokofie Area in the Hohoe MA

**Methodology:** Qualitative study using Focus Group Discussions. A Landsat TM image was analyzed to detect the degree of land use/ land cover change.

**Results:** Drivers of change- Population pressure and associated market demands, increasing land fragmentation, Accelerated logging and erratic weather conditions in recent times. Livelihood Impact: Use of agro-chemicals making farming more expensive for the poor, Emergence of insect pests and weevils, which attack fruits and grains, increased time spent in search of fuelwood, lack of access to constructional timber. Local Resilience: Engagement in multiple activities, seasonal migration to low lying areas to engage in rice farming, Social networks and family support by way of remittances, capital mobilization through micro-finance schemes (Plan Ghana) to initiate small businesses

**Conclusion:** We foresee serious consequences for this unique agro-ecological zone.

**Recommendation:** We recommend state-led strategies for environmental sustainability such as “the Youth in Afforestation Programme” be rolled out in the area with incentives to landowners who will participate as well as enforcement of the laws banning chainsaw operations to safeguard further degradation

## Parallel Sessions- Waste Management

**Authored and Presented by** Vida Adjei

**Topic:** Solid Waste Management In LaNMMA: The Role of the Informal Sector in Waste Management

**Objective:** To assess the role of the informal solid waste management sector in LaNMMA

**Result:** Waste management systems in LaNMMA- Municipal, Private and Informal waste management (Borla taxi)

-Informal waste contribute significantly to waste management and resource efficiency by collection, sorting, trading and sometimes processing waste material

-They fill in the gaps of collecting unpicked solid waste from households and market/business areas  
-Provide employment and income opportunities  
-They complement the work of the SPHU of LaNMMA in the central market area by contributing to the number of workers needed to clean and collect solid waste for final disposal

**Conclusion:** Borla Taxis fill in the gaps of collecting unpicked solid waste from households and market/business areas However, they pose a challenge to the Municipal Assembly, including non adherence to the bye-laws on solid waste management and unmonitored activities. They contribute to the discrepancies between certain households and recognized waste contractors working in the municipality

**Recommendation:** Instead of regarding “Borla” taxi as a problem the Assembly should leverage the already existing infrastructure towards a more efficient waste management system

-Collaboration between researchers, MMDCEs and the solid waste managers.

-Modernizing the “Borla” taxis

-Government should waive duties on solid waste equipment to cut down operational cost for all in the solid waste management sector

-The University of Ghana could assist in integrating them into the formal system through training and short courses on sustainable waste management so that they can manage themselves and their business efficiently.

**Presented by:** Basetsana Rose Kapaya

**Topic:** The Role of Green Procurement in Waste Minimization in the Brewery Industry in Ghana

**Authors:** Basetsana Rose Kapaya and Dr Theophilus Maloreh-Nyamkye

**Objective:** To identify the criteria Accra Brewery Limited (ABL) use to select suppliers, the green procurement practices adapted by ABL and the role green procurement play in waste minimization.

**Methodology and Study area:** Qualitative study using case study design at Accra Brewery Limited (ABL)

**Results:** Green procurement practices adapted by ABL: Circular packaging, Local sourcing, Fuel efficiency, Energy efficiency , Water metre, Wastewater treatment plant, Educate or train staff on green practices , CO2 reclamation system  
-The study revealed that green procurement is also a strategy that helps to improve efficiency, reduce waste and enhance the competitiveness of an organization (Yang & Zhang, 2012).

-The CO<sub>2</sub> reclamation system installed to reduces emissions levels

**Conclusion:** The study has revealed the role green procurement plays in waste mimization.

-The study has found out that green procurement plays a role in emission level reduction and waste minimization in the brewery.

-The brewery industry should work with suppliers and procurement officers to help to make decisions to minimize the waste generated and reduce the environmental impact.

**Recommendation:** The brewery needs to have a clear green procurement policy and adopt green procurement practices in all their operations and process

-The brewery needs to build a solid relationship with suppliers so that they can purchase more green products.

# "Circular Economy as a Tool for Urban Sustainability Transitions"

Presenter: Maria Tomai (United Nations University-MERIT)

Solid Waste Management: A great societal challenge!

Example:

Soil contamination, toxic leachate, GHG emissions (CH<sub>4</sub>, CO<sub>2</sub>), Properties devaluation, local economy devastation, Citizens well-being, Inequalities, etc.



How have policy makers tackled this so far?

National Government Ministry of Environment Ministry of Water & Sanitation, and Municipality are working in Silos

## Circular Economy can be a Policy Design Tool for Urban Sustainability

**Circular Economy** is usually characterized as an economy which is regenerative by design, with the aim to retain as much value as possible of products, parts and materials (materials in transition).



**Urban Sustainability** is the efficient and equitable utilization of today's resources in consideration of the needs of future generations (Akinleye, 2003)

**Sustainability Transition** refers to long-term changes to usage of greener (or less environmentally harmful) technologies, infrastructures and new behaviours shifts towards sustainable development.

**Transitioning to Circular Economy is a form of Sustainability Transition that will contribute to Urban Sustainability. HOW?**

- Recognize the processes in the system
- Recognize the actors
- Recognize the drivers
- Understand the interconnection with the complex system

### The MSWM System & its challenges:

- high "illiteracy" level low law enforcement,
- no segregation at source
- Financial, capacity constraints
- limited investments in recycling
- no land available for disposal

### One of the biggest challenge: Behavioural Change of Citizens, Requiring the 4-Is:

- Information (Environmental education, awareness creation, understanding threats & opportunities)
- Infrastructure (Make it easily available / accessible)
- Incentive (Give reasons to segregate)
- Integration (Get feedback and revise program)

## “Innovative Products, Trading and Education for Implementing the Circular Economy in the Agri-Food Sector”

**Presenter: Dr Tom Curran (University College Dublin (UCD), Ireland)**

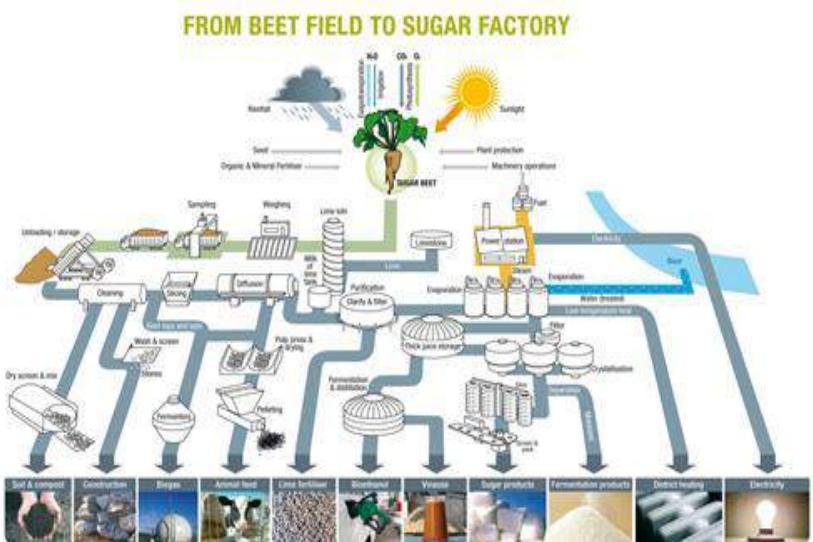
**Objective:** To deliver sustainable waste valorization, address European policy target of reducing food waste by 50% by 2030 and contribute to the change occurring in China in relation to sustainability.

**Project detail:** The AgroCycle H2020 Project is led by the School of Biosystems & Food Engineering, University College Dublin [www.ucd.ie/biosystems](http://www.ucd.ie/biosystems)

3 year project (2016-19), 26 partners: EU and China

€7 million from EC plus ca. €1 million from Government of the People's Republic of China

**Approach:** Developing a ‘Circular Economy’ around the agri-food chain: Pre- and post-farm gate, food and agri-products processing sector, wholesale and retail, waste processing – valorisation incl. biofuels, high value-added biopolymers, energy & micro fuel cells and consumer.



- Pilot scale production of containers made of polymeric biocomposites containing potato pulp fibres as filler.
- Potato pulp fibres up to 20 wt% were added to Poly(lactic acid) (PLA) and Polyhydroxyalkanoate (PHA) based matrices.
- PLA and PHA based biocomposites with potato pulp fibres can be used for industrial production of pots or rigid containers for applications in packaging and agriculture
  
- Design and construction of a hybrid anaerobic/aerobic bioreactor for fruit processing wastewater treatment.
- Pilot demonstration in fruit processing industry
- Main Results: reduced energy consumption, biogas recovery and high quality effluent

**Sustainability Analysis:** AgroCycle protocol specifies rules for carrying out LCA, for example data requirements.  
 -Includes Social LCA; Life Cycle Costing; Environmental LCA  
 -4 Case studies (Rice bran/husk via composting as a fertiliser, corn Stover to produce biobutanol, potato pulp to produce biocomposite, wastewater via AD to produce energy; fertiliser; single cell protein and clean water).

**Dissemination programmes** -Joint Stakeholders Platform (See [www.agrocycle.eu](http://www.agrocycle.eu))  
 -Online Trading of Agri-Food Residues- AgroCycle Marketplace (link at [www.agrocycle.eu](http://www.agrocycle.eu))  
 -AgroCycle Kids (Delivered AgroCycle Kids Bespoke Curriculum in Ireland and aspects of the overall AgroCycle Kids programme delivered to Chinese primary school children in The Affiliated Primary School of Beijing Forestry University.)

**Concluding Remarks:** Need to strengthen regulation, innovative products, trading, and education



# Multi-stakeholder Forum on “Transitions towards a Circular Economy: A Cross-National Study of Urban Solid Waste Management”

Welcome address & Introduction: By Shyama V. Ramani (UNU-MERIT)

**Objective:** international collaborative research through a Cross-National Study of Urban Solid Waste Management: Learnings and Way Forward.

**Method:** Knowledge sharing workshop in cooperation with the Institute for Environment and Sanitation Studies (IESS)

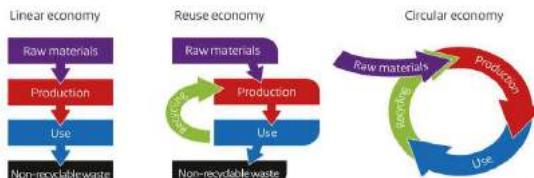
## Why a multi-stakeholder forum?

Because, what you see depends on where you are and the length and breadth of your vision!

Being a passive listener is not acceptable!

The sustainability of our families are threatened as we cross planetary boundaries: Embracing the circular economy model as a streamlined policy design.

### From a linear to a circular economy

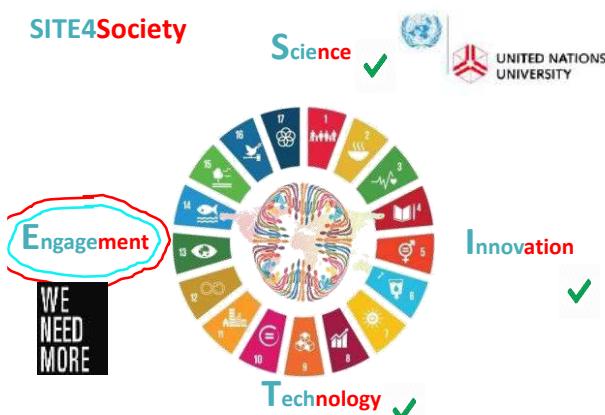


### How are we going to make sustainability transitions happen?

We will explore possible answers: Macro – Sectoral & Systemic Micro - Actor strategies



Being a passive listener is not acceptable!



### SITE4 variables evoked yesterday

- **Science:** Knowledge creation, knowledge sharing
- **Innovation:** Anything new in the system –
  - Digital cards for monitoring
  - New models for public-private partnerships
- **Technology:** Make composting more prevalent
- **Engagement by government:** subsidize compost
- **Engagement by citizens:** bring your bottle
- **Engagement by firms:** Very vibrant in Ghana
- **Engagement by academics:** Coming up

## Parallel Sessions- Waste Management & Climate Change

**Presented by:** Raphael Botchie

**Topic:** Sustainability of Climate Change Adaptation to Farming at Obuadaka in the Eastern Region of Ghana.

**Authors:** Raphael Botchie<sup>1</sup> Daniel Nukpezah<sup>2</sup>

**Purpose:** This paper focused on the sustainability or otherwise of private adaptation of farmers in the Semi Deciduous Rainforest zone of Ghana using a case study approach.

**Methodology:** Qualitative research method employing Case study research design

**Result:** The adaptation strategy involving a shift in planting time from March to April in response to shift in rainfall timing has the concept of risk avoidance

-The concepts of **risk avoidance, reduction of negative impact and risk sharing** are also identified in the farmers' strategy of deliberately cultivating different parcels of land at different dates.

-The strategy of crop diversification to include cowpea and pineapple to reduce over dependence on maize, tomato, plantain which are so vulnerable to the increased climatic variability is an important one.

**Conclusion:** The current farmer adaptation has been found to be reactionary, inefficient and based on trial and error. It was concluded that the farmer's response strategies to climate impact qualify as only coping strategies which signify that, their adaptive capacity was weak.

**Recommendations:** To foster adequate adaptation to climate impacts, there must be adequate, easy to understand weather and scientific information on climate change and potential response measures made available to farmers as a matter of policy from government through extension agents.

**Presented by:** Memuna Mawusi Mattah and Linda Maud Naa-Dedei Palm

**Topic:** A Review of Policies for Reducing Single-Use Plastics (SUPs) in sub-Saharan Africa

**Authors:** Memuna Mawusi Mattah, Linda Maud Naa-Dedei Palm & Precious A. D. Mattah

**Objective:** To look at **Policy contributions** from sub-Saharan African countries through the use of (anti-plastic policies) to curb SUP menace.

**Methodology:** Systematic Review

**Results:** Identified sub-Saharan countries with or without anti-plastic policies, legislation, bans or laws related to SUP.

-36 out of the 54 countries have policies on SUP ban (~67%)

-Mostly the policies employed are **regulatory** (taxes/levies to address SUPs).

-With the exception of **Egypt, Chad and Somalia** which has complete local policies, the remaining countries had a national policy.

-**Tanzania** on the other hand had a combination of local and national policies.

**Conclusion:** There is **policy contributions** from sub-Saharan African countries through the use of (anti-plastic policies) to curb SUP menace.

-The process involved in reducing SUPs seems slow.

-Factors promoting the implementation of SUPs are community Polythene Materials Control Bill 2017, Country cleanliness- plastic pollution in the city reduced and Blockage of drains and water pipes dramatically decreased

-Factors constraining the implementation of SUPs are political interference, enforcement was not strict, enforcement processes were unclear, and weakened by manufacturers' lobby

# Parallel Sessions- Waste Management & Climate Change

**Presented by** Dennis Ofori-Amanfo

**Topic:** Impact of Faecal Sludge Digestate on Growth and Yield of lettuce plant

**Authors:** Dennis Ofori-Amanfo, Ahmed Issahaku, Simon Agyei Sakyi, Esi Awuah (Prof), Emmanuel Ntumy (PhD), & Florence Cobbold

**Objectives:** To identify what stage of LHFSTP can be made useful in Agriculture and the Impact of the Digestate on Lettuce Plant.

**Methodology:** Experimental research design

**Results and Conclusion:** Plant height can be increased by the application of 50% UASB digestate after two weeks and three weeks of application of the treatment.

-Number of leaves can also be increased by the treatment after week 7, when the treatment is applied on the 4<sup>th</sup> week. 50% UASB digestate will be the best option

-50% UASB digestate can increase plant height by 7.73cm on the 7<sup>th</sup> week when treatment is applied on the 4<sup>th</sup> weeks, whilst number of leaves can also increase by 4.5 count on the same condition.

-50% UASB digestate can contribute to yield by increasing the dry matter by 20.93% and also dry weight by 3.91g.

-Transforming semi-treated faecal sludge to a liquid fertilizer may be utilized as a means of tackling sanitation challenges in Ghana. The results of this study suggest that faecal sludge-to-liquid-fertilizer could be a widely transferable solution for FS management.

-The results will be useful in the design of an integrated FSM scheme for sustainable environmental sanitation in the country by decision and law makers

**Presented by** Phillips Oluwatomowa

**Topic:** Lessons from facilitating community-led waste management processes in Lagos, Nigeria

**Authors:** Phillips Oluwatomowa, Sesan Temilade, and Ojelede Agharese

**Objective:** This research investigates the constraints and opportunities for establishing a community-led model of solid waste management in Abete and Afolabi-Alasia, two informal settlements in the Ijora-Badia area of Lagos, Nigeria.

**Methodology:** Qualitative research using Observation, FGD and interviews

**Results:** There was a general acknowledgement that there was a serious waste management issue in the communities

-There's a perception that working with waste is a dirty job and no responsible community member will engage in such an occupation

-A few people participated in an earlier recovery scheme

**Challenges:** -The people consider waste management to be a public good, a service that needs to be provided for and maintained by the government

The people view their community as temporary (marked by a lack of desire to establish firm roots)

-Recovering of waste for recycling, was of minimal interest to the community members.

-The financial compensation for sorting and collection of plastic bottles, is very minute compared to the efforts put in. this was very discouraging for the women

**Opportunities:** Some youths showed interest in community sensitization, offering to lead an initiative that would carry out educational campaigns regarding proper waste and sanitation practices.

-They were also of the opinion that public naming and shaming of offenders.

-The residents generally indicated interest in paying to use general dumpsites.

-There was also a renewed interest in recycling and recovery, especially when they were intimated about the possible financial gains from engaging in such activities

## Parallel Sessions- Waste Management

### AD as a waste, water, energy, health solution

**Prof. James Chong & Dr. Richard Friend**

Exacerbated by earthquake of 2015, which caused breakdown in power, water and sanitation provision

Kathmandu, Nepal → combines substantial waste in rivers, incomplete sewage connectivity, unequal access to clean water and energy and health issues arising from sewage exposure.

### Governance dimensions of transformations

- Waste is “dirty” and requires re-education/select community involvement
- Substantial community engagement/interest but 5/7 sewage treatment facilities have failed within a few years of installation
- Large scale infrastructure may not be the most effective means forward- multiple smaller scale installations may be more equitable and resilient.

### Interventions in refugee camps

**Prof. James Chong, Dr. Richard Friend & Dr. Sarah West (SEI-York)**

- Explored waste management in Aida camp and other communities on the West Bank, through Shatha Alazze (Aida Camp)
- Interventions incl. upcycling, composting → Ecological redundancy

### The “WasteShed”

**Jo Rose**

- Starting a conversation for cross comparison between waste management/issues/solutions in refugee camps in Jordan, the West Bank and

**Topic: prevention is better than cure in the fight against food waste**

**Presented by Nicholas M. Holden** (University College Dublin, Belfield, Dublin 4, Ireland)

**The Problem:** huge amounts of food that was produced with high impact is being wasted

-There has not been the distinguish between wasted food and residue/AWCB

### Suggested definitions:

- “**Waste**” strictly to describe those materials that are not utilisable and are disposed of in the biosphere sink
- “**Residue**” to describe those materials that are unavoidable, but not consumable for their primary purpose
- “**Wasted food**” or “wasted product” for material that has been mismanaged and should never have ended up in a secondary processing technology” (Oldfield et al., 2016)

**The solution:** getting more value from waste and surplus food and drinks

Organic Farm generating five-star electricity from cow dung and food waste

Once we have ‘spent’ resources on making food, we cannot offset that spend by valorisation

Preventing 150 g wasted food per €1 spent on a minimization programme would have the same benefit as the best valorisation option

€1M investment would only have to avoid 150 t wasted food to have the same benefit as investing in

## Conference Gallery



## Exhibition Stand- Products made from recycled car tyres



## Conference Gallery- Group Photograph



## Multi Stakeholder FORUM

