REPORT OF THE 2023 YOUSUSTAIN CONFERENCE

6TH TO 8TH DECEMBER 2023

UNIVERSITY OF GHANA

PAUL DANKWA

TABLE OF CONTENT

1.0 LIST OF ABBREVIATIONS **6**

1.2 BACKGROUND **7**

2.0 GRANTS AND FUNDING **8**

2.1 TRAVEL AND ACCOMMODATION GRANTS 8

2.2 FUNDING OPPORTUNITIES 8

3.0 DAY 1- WEDNESDAY, 6TH DECEMBER 2023 **8**

3.1 ATTENDANCE AND REGISTRATION **8**

3.2 OPENING REMARK SPEECH **9**

3.3 KEYNOTE SPEECH **10**

3.4: PRESENTATION BY NEIP: SUSTAINABLE YOUTH ECOPRENEURSHIP: THE NEIP WAY **11**

3.5: PANEL DISCUSSIONS: BARRIERS AND OPPORTUNITIES IN GREEN BUSINESSES FOR YOUNG PEOPLE. **12**

3.6: SPOTLIGHT PRESENTATIONS **14**

3.6.1: Spotlight Presentation 1: Geopolymer Technology for Urban Conservation, Regeneration, and Green Infrastructures. 14

3.6.2: Spotlight Presentation 2: Go Green Smart Biogas Integrating IoT for Sustainable Biogas 16

3.6.3: Spotlight Presentation 3: Repurposing Plastic Waste: A Sustainable Solution for Wearables and Decorative Elements. 18

3.6.4: Spotlight Presentation 4: Resilient Waterfront Architecture and Planning to Curb Urban Sprawl along Water bodies -The case of Weija Reservoir, Ghana. 19

3.7.1: General Oral Presentations 1: EcoWatch 20

3.7.2: General Oral presentations 2: I want to save the planet. The Influence of Climate Change Literacy on Pro-environmental Behavior. 21

3.8: POSTER PRESENTATIONS: **22**

3.8.1: Poster Presentation 1: Investigating the causes of low borehole yields and unsuccessfully drilled boreholes in the Voltain Basin: a case study in West Gonja District 22

3.8.2: Poster Presentation 2: The political ecology of e-waste smuggling into Ghana 22

3.8.3: Poster Presentation 3: Assessing wood Waste Production: A case Study of the Coppon Sawmill Company Annex Located at Afosu in the New Abirem Municipality, Eastern Region, Ghana. 23

3.8.4: Poster presentation 4: Nitrogen Bioremediation by Arbuscular Mycorrhizal Fungi (AMF) and Biochar for Optimum Reduction in Environmental Pollution. 24

3.8.5: Poster Presentation 5: The Hidden Walls: Barriers to Effective Adaptation Communication. 25

3.8.6: Poster presentation 6: Flood monitoring and damage assessment in agricultural fields using sentinel-1 SAR Images and digital elevation models: A case study of the White Volta River in Ghana. 26

3.9: RESEARCH INTO ACTION: CLIMATE AND DEVELOPMENT KNOWLEDGE NETWORK (CDKN). 27

3.10: EXHIBITIONS 27

3.11: CLOSING OF DAY 1 32

4.0: DAY 2-THURSDAY, 7TH DECEMBER 2023 33

4.1: ATTENDANCE AND REGISTRATION 33

4.2: PARALLEL SESSION 1 35

4.2.1: Research Presentation 1: How effective are climate-smart irrigation strategies in Chereponi, Ghana? Estimation of crop water requirements and irrigation schedules. 35

4.2.2: Research Presentation 2: Evaluation of the Water Quality and User Perception of Reclaimed Air Conditioner Condensate. 36

4.2.3: Research Presentation 3: Empowering Inclusivity: A Just Transition for Persons with Disabilities in Ghana through the Disability Common Fund 37

4.2.4: Research Presentation 4: Assessment of Past and Future Potential of Ocean Wave Power in the Gulf of Guinea. 38

4.2.5: Research Presentation 5: Design of a sanitising system for enhanced hygiene and safety. Incorporating sanitising features into doors for enhanced hygiene and safety. 39

4.2.6: Research Presentation 6: Unlocking Agricultural and Socioeconomic Prosperity through Green Hydrogen: A Southern African Perspective 40

4.2.7: Research Presentation 7: A Study of Institutional Responses to Climate Change Vulnerabilities at Slums in Lagos, Nigeria 42

4.3: PARALLEL SESSION 2 44

4.3.1: Research Presentation 1: Integration of trees on farms by smallholder farmers in the Atwima Mponua District. 44

4.3.2: Research Presentation 2: Influence of Climate Change, Environmental Degradation, and Natural Resource Scarcity on Herder-Farmer Conflict in the West Mamprusi Municipality of Ghana. 46

4.3.3: Research Presentation 3: Assessing the Benefits of Mangroves in Flood Reduction in the Coastal Communities of Rivers State Using InVEST Coastal Vulnerability Model 47

4.3.4: Research Presentation 4: Sustainable agriculture practices 48

4.3.5: Research Presentation 5: Creating Sustainable Waste Management through Compost in the Kassena-Nankana West Municipal 49

4.3.6: Research Presentation 6: A comprehensive framework for estimating the rate of

4
mining-induced climate change in Ghana. 50
4.3.7: Research Presentation 7: Linking Education with Sustainable Development In Uganda: A Case of the New Lower Secondary School Competence-Based Curriculum Implementation Approaches for Sustainable Development in Selected Schools of Kabale District. 51
4.3.8: Research Presentation 8: Neglected Resource 52
4.4: REMARKS ON THE SECOND DAY OF THE CONFERENCE 53
5.0: Day 3 54
5.1: Registration and attendance 54
5.2: At the Or Foundation 56
5.3: At the Warehouse 56
5.4: At the showroom 57
6.0: CONCLUSION 59

1.0 LIST OF ABBREVIATIONS

AMF	Arbuscular Mycorrhizal Fungi
ANOVA	Analysis of Variance
CDKN	Climate and Development Knowledge Network
CEO	Chief Executive Officer
DAC	Direct Air Capture
DCF	Disability Common Fund
DEM	Digital Elevation Model
EPA	Environmental Protection Agency
EPR	Employment-to-Population Ratio
GAYO	Green Africa Youth Organization
GHG	Green House Gas
GMT	Greenwich Meantime
GoG	Gulf of Guinea
IoT	Internet of Things
ISSER	Institute of Statistical, Social, and Economic Research
LiDAR	Light Detection and Ranging
MAGLEV	Low Altitude Magnetic Levitating Device
$MtCO_{2e}$	Metric Tons Carbon Dioxide Equivalence
NEIP	National Entrepreneurship and Innovations Programme
NGO	Non-Governmental Organization
PPE	Personal Protective Equipment
PWD	Persons With Disability

RADAR	Radio Detection and Ranging
SAR	Synthetic Aperture Radar
SGDs	Sustainable Development Goals
UN	United Nations
WASH	Water Supply, Sanitation, and Hygiene
WEC	Wave Energy Converter
WHO	World Health Organization
WQI	Water Quality Index

1.2 BACKGROUND

Africa's youthful population continues to skyrocket as the climate crisis rises. The rising population of the African continent and the quest for decent living through sustainable livelihood options force many to migrate to urban areas in the continent. Poverty, population increase, unemployment, and environmental degradation are the factors that exacerbate this urban sustainability challenge. This has left a deep hole in sustainable infrastructure and practices in major cities within sub-Saharan africa.

The situation has become dire because young people are at the forefront of the impacts of climate change and unsustainable practices. This brings up the need to bridge the gap between providing sustainable means of livelihood for the younger generation and promoting economic growth.

Achieving sustainability in urban cities is a struggle for most African countries. Although the struggles in some of these cities are unique, shared challenges are ubiquitous across the continent. Hence, synthesizing sustainable business ideas into viable ecopreneural ventures was at the core of the YouSustain Conference.

The YouSustain Conference thus created the forum for young people, developmental agencies, and researchers to have an intellectual discourse on how best young people can be supported to contribute to urban sustainability in sub-Saharan Africa through ecopreneurship. The conference also highlighted presentations from young researchers and exhibitions from young people who are into green businesses.

The specific objectives of the conference were to:

- Provide a networking and resource opportunity for young people involved in ecopreneural businesses to share knowledge and potentially collaborate for green business development.
- Select viable ecopreneural ideas from the conference and provide them with incubation support and potential grants for their project implementation.
- Create a platform for young people to showcase their green businesses, products, and services, and gain exposure and visibility for their work to explore avenues for upscaling.

- Explore how successful practices and solutions for sustainability in sub-Saharan African cities can be transformed into viable youth-led ecopreneurship ventures, and identify the key enabling factors and potential barriers to their establishment and growth.

2.0 GRANTS AND FUNDING

2.1 TRAVEL AND ACCOMMODATION GRANTS

The Conference organizers supported presenters and exhibitors with grants. Presenters from the Greater Accra region were supported with travel grants of GH₵400, and those from neighbouring regions like the Ashanti Region, Central Region, and Eastern Region were given GH₵600 travel grants. Presenters and exhibitors from far-off regions like the Western Region and the northern regions of Ghana were given a transportation grant of GH₵800 each. Accommodation was provided for 2 foreign presenters. One from Nigeria and one from Benin.

2.2 FUNDING OPPORTUNITIES

Climate Knowledge and Development Network (CDKN), one of the partners of the conference, offered to sponsor select few of the researchers and exhibitors with funding of over US$10,000. This fund is to help the researchers churn their research into viable business ventures and to also help the exhibitors upscale their businesses.

3.0 DAY 1- WEDNESDAY, 6TH DECEMBER 2023

3.1 ATTENDANCE AND REGISTRATION

The conference occurred in hybrid formats. The first day was held at the Institute for Statistical, Social, and Economic Research (ISSER) Hall. Registration at the event started at 8:30 AM and closed at 4:45 PM. 210 people were selected to attend the first day of the conference. Overall, 170 participants representing 71.4% of selected participants turned up in person for the first day of the conference. The attendees included University students, basic school students, oral presenters,

poster presenters, green products exhibitors, keynote and opening remark speakers, the Director of Operations of the National Entrepreneurship and Innovations Planning (NEIP), conference organisers and general attendees.

69% of the participants were males and 31% were females. The majority (42%) were aged between 18 and 25 years followed by participants between 15 and years (37%). This information is presented in Figures 1 and 2 below. Participants in both hybrid and in-person formats comprised Ghanaians, Nigerians, Beninoise, Namibians, Ugandans, and Kenyans.

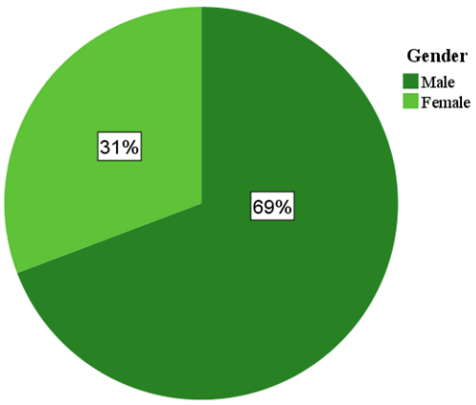


Figure 1. Attendance by gender for day 1

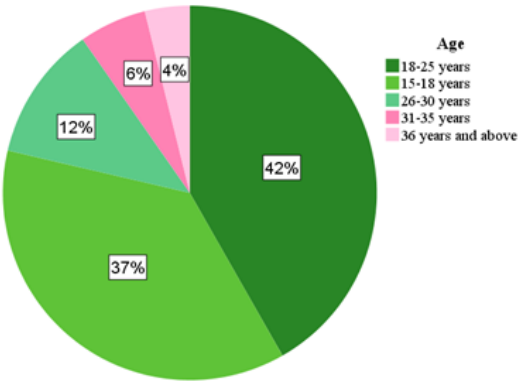


Figure 2: Attendance by age for day 1

3.2 OPENING REMARK SPEECH

Mr Desmond Alugnoa, the programme manager of Green Africa Youth Organization (GAYO) delivered the opening remark speech at 9:40 GMT. His speech set the tone for the conference and its expected outcomes. Mr Desmond cited that the YouSustain Conference is an avenue to showcase young people's creativity in synthesising innovative sustainability ideas and research work into viable green businesses.

In his speech, he quoted;

"The Yousustain initiative aims to provide a dedicated space for publicizing research, especially in the field of climate change and environmental concerns. This platform empowers young people to

address these issues confidently and unapologetically. The conference is solution-focused, with an emphasis on shifting resources and attention to the global south, tackling the pivotal climatic challenges we face".

He ended his speech by calling on all stakeholders to support the quest for empowering young people to contribute to the promotion of sustainability in sub-Saharan African cities.

3.3 KEYNOTE SPEECH

Mr Makafui Awuku gave the keynote speech at the conference. Mr Awuku is the founder and CEO of Mckingtorch Africa. He is an innovator, entrepreneur, artist, and environmentalist. Delivering the keynote address he cited his journey through life as a young innovator who had the passion to turn his dream of repurposing plastic wastes into sellable materials.

Mr. Awuku emphasized the crucial role of support in fostering sustainable cities. He pointed out the current environmental dilemma stems from a lack of sustainable initiatives. He urged young people to register their organizations to tap into available opportunities and collaborate effectively to address the global climate crisis.

Inshot: Mr Makafui Awuku delivering the keynote address

3.4: PRESENTATION BY NEIP: SUSTAINABLE YOUTH ECOPRENEURSHIP: THE NEIP WAY

Mr Kofi Arhin, Director of Operations for the National Entrepreneurship and Innovations Planning stressed the importance of ethical business practices in contributing to environmental sustainability. in his presentation on the role of the NEIP in supporting young ecopreneurs, he stressed that harnessing the entrepreneurial spirit and innovative thinking of youth can lead to the development of groundbreaking solutions to complex challenges. He added that Through technology, social entrepreneurship, and other innovative approaches, youth can drive transformative changes that have a lasting impact on sustainable development.

He further argued that achieving the SDGs requires a collective effort and that the responsibility does not solely lie with organizations like the UN. He highlighted the critical role of youth in driving sustainable development through innovative solutions and environmentally conscious business practices.

He cited some projects the NEIP has undertaken that young people can replicate to promote sustainability in their cities. Some of these projects included a greenhouse at Dawhenya that showcases environmentally friendly practices in agriculture. He stressed that the NEIP has supported some young entrepreneurs through capacity building and funding.

Concluding his presentation, he emphasized that the NEIP is open to supporting young people within Ghana who have the passion to drive sustainability through entrepreneurship and they should always reach out to them whenever necessary.

Inshot: Mr Kofi Arhin delivering his presentation at the conference

3.5: PANEL DISCUSSIONS: BARRIERS AND OPPORTUNITIES IN GREEN BUSINESS FOR YOUNG PEOPLE.

The challenges and opportunities available for young people to venture into ecopreneurship were at the core of the panel discussions. The panel comprised Jacob Johnson Attakpah as the moderator with Selassie Charway, Chloe Asaam, and Isaac Danso as experts. Isaac Danso participated virtually while the other two were in-person.

Ms Selassie Charway:

Ms Chloe Assam in explaining the challenges of employing circular economy principles in the waste management sector and how opportunities can be accrued from it young people opined that "one of the foremost challenges in waste management is the prevailing perception, and significant efforts are underway to change this mindset". Policy responsibility remains a major hurdle in effectively tackling waste issues. Additionally, there is a notable lack of alternative solutions being offered for local communities to utilize

Ms Chloe Asaam

Ms Chloe stated, "Over 25 million clothing items are circulated at Kantamanto every month, and approximately 40% of the 15 million items of waste received weekly go into waste". She suggested that there's no support for the informal waste sector hence their inability to get access to finance. She also explained that perception has played a huge role in creating barriers to people seeking support.

Regarding the OR foundation, she said there is an internal fund that is made available to graduates who come to the foundation. She contrasted this with an extended polluter responsibility scheme which exists mainly in France and how such a scheme forces polluters to reduce their waste. She also said we in the global south are gravitating towards insatiable consumption habits because we spend most of our resources consuming clothes from the global north.

Speaking about how we can improve the current situation she said it's all about accountability and responsibility. There is a need to improve the quality of materials and reduce the volume of waste (clothes) and that is the main goal of the organization (OR FOUNDATION)

Isaac Danso

Isaac discussed the 'Nationally Determined Contributions,' which stems from the national adaptation plan and cross-sectoral policies. He highlighted five cross-sectoral policies, with youth groups representing them, effectively creating an environment conducive to private sector participation in climate action. Notably, he mentioned that a significant number of Ghanaian youths have become engaged in climate change initiatives due to this supportive environment.

However, Isaac pointed out the shortfall in funding, which he views as a barrier to achieving comprehensive climate action goals. Addressing potential solutions, he mentioned the role of government support, citing the National Youth Authority's establishment of a commission aimed at engaging the youth. He emphasized the vital role of young people in driving climate action forward.

Inshot: Experts and moderator at the panel discussions

3.6: SPOTLIGHT PRESENTATIONS

The spotlight presentations were purposefully to elucidate young people's contribution to sustainability in sub-Saharan African cities. Essentially, they intended to highlight the practical research works and projects that young people have initiated that have contributed to promoting sustainability in African cities and to feed into the panel discussions. The spotlight presentations were done only on the first day of the conference.

3.6.1: Spotlight Presentation 1: Geopolymer Technology for Urban Conservation, Regeneration, and Green Infrastructures.

Author: Gertrude Akosa

Theme: Urban conservation and regeneration and green infrastructures

Gertrude Akosa highlighted the rising demand for sustainable housing due to global population growth. She noted that Ghana faces a significant housing deficit and proposed using environmentally friendly geopolymer as a solution. Geopolymers, she argued, not only fit into the circular economy

but also enhance energy efficiency in buildings, presenting a viable market opportunity for young ecopreneurs.

Her presentation highlighted the importance of geopolymer technology; a low-cost, environment-friendly concrete with the potential to reduce the energy consumption rate of buildings and prevention of environmental pollution. She highlighted the environmental damages caused by the manufacturing of conventional cement and energy inefficiency in buildings constructed using these types of cement products. She presented the following findings:

- Geopolymer concrete has a lower thermal conductivity which helps reduce building energy consumption by 50%.
- 70% less energy is required in the entire geopolymer concrete manufacturing process than in conventional cement concrete.

In her conclusion, she explained that geopolymer technology fits perfectly into the circular economy model of resource utilization since it makes use of recycled aluminosilicates from quarry waste and mine tailings. She then added that there is a great potential for scaling up geopolymer concrete to reach larger markets and called on all stakeholders present to patronise geopolymer concrete technology as a panacea to sustainability problems in building constructions in sub-Saharan Africa.

Significance for promoting sustainability in sub-Saharan African cities.

- **Contribution to Sustainability:** Geopolymer technology offers an environmentally friendly alternative to traditional concrete. Using recycled aluminosilicates aligns with the circular economy, reducing the environmental impact associated with conventional cement production.
- **Energy Efficiency:** Geopolymer concrete's lower thermal conductivity contributes to a 50% reduction in building energy consumption, addressing energy efficiency in urban constructions.

- **Market Opportunities:** The presentation emphasizes the potential for young ecopreneurs in the market, encouraging sustainable business practices.

3.6.2: Spotlight Presentation 2: Go Green Smart Biogas Integrating IoT for Sustainable Biogas

Author: Portia Nimoh Osei-Anto

Theme: Climate-related hazards and nature-based solutions

Portia Nimoh Osei-Anto elucidated their project on integrating the Internet of Things (IoT) as a digital platform to monitor process parameters and provide insight into digester operations. She highlighted that such a platform will enable easy detection of the amount of gas generated by a biogas plant.

The project, as explained by Portia, is meant to be a panacea to the extensive dependence of rural communities on charcoal and wood as a source of energy for cooking. She highlighted the following findings:

- Setting up the IoT device will create employment for better economic growth which relates to SDG goal 2.
- It is anticipated that using the IoT device can detect the amount of gases released into the atmosphere.

She concluded that incorporating IoT devices in a biogas digester not only improves operational efficiency but also enhances sustainability efforts by promoting renewable energy generation.

Significance for promoting sustainability in sub-Saharan African cities.

- **Renewable Energy:** The integration of IoT in biogas production promotes sustainable and renewable energy sources, reducing dependence on charcoal and wood in rural communities.
- **Job Creation:** The project aims to create employment opportunities, aligning with Sustainable Development Goal 2 (SDG 2) for economic growth.

- **Environmental Monitoring:** The use of IoT devices enhances operational efficiency and sustainability in biogas production by providing real-time insights into process parameters.

Inshot: Portia Osei Nimo-Anto delivering her spotlight presentation

3.6.3: Spotlight Presentation 3: Repurposing Plastic Waste: A Sustainable Solution for Wearables and Decorative Elements.

Author: Isaac Ayensu

Theme: Waste management and circular economy

Isaac Ayensu's presentation focused on creating wearable and reusable items from plastic waste. He underscored the potential of upcycling plastic waste in contributing to the Sustainable Development Goals (SDGs), emphasizing the need for a mindset shift and public willingness to see the value in such initiatives.

He added that repurposing plastic wastes for decors, aesthetic artefacts and wearables is a viable solution that can significantly reduce plastic waste pollution. He also stated that some giant fashion

brands, startups, clubs and societies have adopted this idea and are incorporating it into their routine activities and businesses.

He concluded his presentation by asking can upcycling plastic waste for decorative and aesthetic purposes be an innovative and sustainable solution to help reduce plastic waste pollution? Will you patronize the concept?.

Significance for promoting sustainability in sub-Saharan African cities.

- **Upcycling and Circular Economy:** The presentation focuses on repurposing plastic waste for wearables and decorative items, contributing to a circular economy and reducing plastic waste pollution.
- **Mindset Shift:** Emphasizing the need for a mindset shift, the presentation encourages public willingness to adopt sustainable practices, including the use of upcycled products.
- **Industry Adoption:** Mentioning the adoption of the idea by fashion brands and startups indicates potential for broader acceptance and application.

Inshot: Isaac Ayensu delivering his spotlight presentation

3.6.4: Spotlight Presentation 4: Resilient Waterfront Architecture and Planning to Curb Urban Sprawl along Water bodies -The case of Weija Reservoir, Ghana.

Author: Cornelius Boateng

Theme: Urban planning and governance

Cornelius Boateng delivering the fourth spotlight presentation underscored the importance of implementing buffer policies along the Weija Dam. Their research utilized Landsat Imagery and existing buffer policies to explore ways in which the reservoir front can minimize sprawl through resilient planning and architecture.

He explained that 13% (34.2 hectares) of the 90-meter-wide buffer of the reservoir had been lost due to encroachment. He further posited that the increase in encroachment at the waterfront is a result of illegal construction along the waterfront and landowner issues.

He added that such practices coupled with the decline in the area of the buffer zone have severely hampered the inhabitant's capacity to adapt to the impacts of climate change. The study recommended strategies to curtail the problem including developing mixed communities and higher-density regional centers.

Significance for promoting sustainability in sub-Saharan African cities.

- **Climate Change Adaptation:** Highlighting the impact of urban sprawl along water bodies, the presentation proposes resilient planning strategies to mitigate climate change effects.
- **Buffer Policy Implementation:** Recommending buffer policies to curb encroachment demonstrates a practical approach to preserving water bodies and enhancing community resilience.
- **Mixed Communities:** The suggestion to develop mixed communities and higher-density regional centres promotes sustainable urban planning.

3.7.1: General Oral Presentations 1: EcoWatch

Author: George Frimpong Boateng

Theme: Climate-related hazards and nature-based solutions

George Frimpong Boateng delivered a presentation on the topic "EcoWatch". His study is centred around a comprehensive environmental monitoring and economic advancement system. The system monitors and reduces harmful emissions by industries in the country. The system, explained by George, employs state-of-the-art sensors for real-time and accurate gas content detection from factories.

He added that such a system supports local innovations by utilising locally made sensors. The monitoring system works through the following methods:

- Create a reliable alert system for immediate response to gas emissions exceeding standards.
- Send SMS notifications to responsible personnel and trigger alerts to the Environmental Protection Agency (EPA) and task force, ensuring swift corrective actions.

Significance for promoting sustainability in sub-Saharan African cities.

- **Environmental Monitoring:** The EcoWatch system contributes to environmental sustainability by monitoring and reducing harmful emissions from industries.
- **Local Innovation Support:** Utilizing locally made sensors supports local innovation, aligning with sustainability goals.
- **Swift Response:** The alert system ensures a prompt response to gas emissions, minimizing environmental impact.

3.7.2: General Oral presentations 2: I want to save the planet. The Influence of Climate Change Literacy on Pro-environmental Behavior.

Author: Hayford Alufar Bokpin

Theme: Education for sustainable development and environmental stewardship

Hayford Alufar Bokpin's presentation Highlighted the nexus between knowledge of climate change and responsible environmental behaviour using a simple linear regression model. The study sampled 265 university students in Accra.

The findings revealed that there was a strong correlation ($F = 11.55$, $p = .00$) between knowledge of climate change and pro-environmental behaviour. Thus the authors concluded that pro-environmental behaviour is influenced by climate change literacy. He further explained that People who know more about climate change are more likely to adopt environmentally responsible behaviours.

The following conclusions were drawn from the study:

- Climate change literacy can contribute to the success of mitigation schemes.
- Climate change literacy will ensure responsible individual behavior which can help mitigate the effects of climate change.
- Education programs should target individually meaningful outcome behaviours, e.g., gardening, conservation and recycling.

Significance for promoting sustainability in sub-Saharan African cities.

- **Knowledge and Behavior Link:** The presentation establishes a link between climate change literacy and pro-environmental behaviour, emphasizing the importance of education in fostering responsible behaviours.
- **Mitigation Support:** Climate change literacy is presented as a factor contributing to the success of mitigation schemes, promoting responsible individual behaviour.

3.8: POSTER PRESENTATIONS:

6 poster presentations were made on the first two days of the conference. 2 females and 4 males presented their posters at the conference.

3.8.1: Poster Presentation 1: Investigating the causes of low borehole yields and unsuccessfully drilled boreholes in the Voltain Basin: a case study in West Gonja District

Author: Ellen Benyarku

Theme: WASH

Ellen Benyarku's study within the WASH thematic area investigated the causes of low borehole yields and unsuccessful borehole drills in the Voltain basin. Her research concluded that low borehole yields within the study area are controlled by geologic formations. This strongly reduces the adaptation capacity of the people affected by these water shortages. It also poses severe sanitary threats, especially among teenage girls during their menstrual period. The research recommended that boreholes shouldn't be sited close to each other.

Significance for promoting sustainability in sub-Saharan African cities.

- Addressing water scarcity issues by understanding and addressing the causes of low borehole yields.

3.8.2: Poster Presentation 2: The political ecology of e-waste smuggling into Ghana

Author: Yvonne Illupeju

Theme: Waste management and circular economy

Yvonne Illupeju's poster presentation mapped out e-waste management within the Old Fadama and Agbogbloshie areas of Accra. It investigated the channels of entry of e-waste into the Ghanaian

market and the working conditions of the people involved in e-waste management. The study revealed that e-waste workers work in deplorable conditions with no PPE on when working. Her study also highlighted the weakness of state institutions in managing the import of waste into the country.

Significance for promoting sustainability in sub-Saharan African cities.

- Highlighting the environmental and health impacts of e-waste smuggling, calling attention to the need for better waste management practices.

3.8.3: Poster Presentation 3: Assessing wood Waste Production: A case Study of the Coppon Sawmill Company Annex Located at Afosu in the New Abirem Municipality, Eastern Region, Ghana.

Author: Lord Offei-Darko

Theme: Waste management and circular economy

Lord Offei-Darko presented a poster on assessing wood waste production at the Coppon Sawmill Company Annex in the New Abirem Municipality of the Eastern Region of Ghana. Employing reconnaissance survey technique, the author discovered that the wood waste generated was in three different categories, offcuts, Kerflos, and sawdust. He explained that for every 5,336cm^2 of felled timber trees, 4,535kg of sawdust is obtained after sawmill processing. He underscored the problem of burning the sawdust as waste instead of applying circular economy principles like reusing or repurposing them.

Significance for promoting sustainability in sub-Saharan African cities.

- Advocating for circular economy principles in handling wood waste generated by sawmills.

3.8.4: Poster presentation 4: Nitrogen Bioremediation by Arbuscular Mycorrhizal Fungi (AMF) and Biochar for Optimum Reduction in Environmental Pollution.

Author: Jean Bosco Ngarukiyimana

Theme: Urban and peri-urban agriculture, climate-smart agriculture and food system

Jean Bosco Ngarukiyimana's study aimed at modelling the environmental risk of nitrate leaching and determining the reduction of leachate volume from Nitrogen fertilization associated with biochar and bioremediation of AMF.

The study employed factorial analysis of variance (ANOVA) using GenStat 19th edition. Significant differences were evaluated at $P \leq 0.05$ and the means were separated using Tukey's Honestly Significant Difference Post hoc test.

The following results were achieved:

- The model predicted that the risk of NO^{3-} leaching beyond the root zone is 2.06 times in the absence of AMF and Biohar at the highest rate of Nitrogen fertiliser application.
- Under similar application rates of nitrogen, the presence of AMF and Biochar significantly decreased the concentration of NO^{3-} in the leachate, as well as decreased the leachate volume.

The authors recommend using AMF and biochar to reduce NO^{3-} and water loss below the root zone to increase food production in an environmentally sustainable manner.

Significance for promoting sustainability in sub-Saharan African cities.

- Offering a sustainable solution for reducing environmental pollution associated with nitrogen fertilization.

3.8.5: Poster Presentation 5: The Hidden Walls: Barriers to Effective Adaptation Communication.

Author: Abednego Adjei-Baffoe

Theme: Climate adaptation and climate policy

Abednego Adjei-Baffoe's study on the above topic utilized the Concurrent Triangulation Mixed methods research design to investigate the hidden barriers in climate adaptation communication.

The study revealed that the language barrier (27%) was the leading cause of the lack of understanding of public awareness of climate change within the study area. This was proceeded by a lack of education (22%).

The findings from the research identified community-specific communication barriers, allowing for the development of tailored communication strategies that empower these communities to better understand, adapt to, and mitigate the impacts of climate change.

It also revealed that localised approaches can help bridge the gap in public understanding and engagement with climate change, making the information more relevant and accessible to the people in these communities.

In that vein, the authors recommended that climate change messages be developed in local dialects to enable effective comprehension of the message. They also recommended that local communities be involved in the co-creation and dissemination of climate adaptation communication materials.

Significance for promoting sustainability in sub-Saharan African cities.

- Identifying and addressing barriers to effective climate adaptation communication, emphasizing the importance of tailored approaches.

3.8.6: Poster presentation 6: Flood monitoring and damage assessment in agricultural fields using sentinel-1 SAR Images and digital elevation models: A case study of the White Volta River in Ghana.

Author: Raphael Guribie

Theme: Climate-related hazards and nature-based solutions

In monitoring the extent of flood damage in agricultural fields in the White Volta River basin of Ghana, Raphael Guribie utilized Sentinel-1 and Sentinel-2 images coupled with Digital Elevation Models (DEM) and Synthetic Aperture Radar (SAR).

The processed satellite images were overlaid to determine the extent of flood damage within the study area. The author discovered that grassland in the Upper Volta Basins was the most affected by the flood for all three days of data collection (i.e. 12th, 18th, and 24th September 2018). The same discovery was made for the Lower Volta as well.

The study established Flood disparities in the study area and how they affect farming activities in the upper and lower Volta. It also assessed the vulnerability and estimated the damages incurred by farmers.

Based on the findings, the author made the following recommendations:

- High-quality data should be used for flood analysis in the region. Open data should be corrected and improved as much as possible using ground data before being used for analysis.
- High-quality DEMs such as LiDAR should be used for flood analysis in the region. RADAR images are recommended for flood studies in the region since the area is mostly cloudy in the rainy season.
- Farmers should as much as possible desist from farming very close to the river during the rainy season. Farmers farming close to the riverbank in the rainy season are advised to consider the use of early maturing seeds, water-resistant crops, and farming practices for early harvesting of matured crops.

Significance for promoting sustainability in sub-Saharan African cities.

- Providing insights into flood damage assessment and suggesting measures for sustainable farming practices in flood-prone areas.

3.9: RESEARCH INTO ACTION: CLIMATE AND DEVELOPMENT KNOWLEDGE NETWORK (CDKN).

The practicality of research is lacking in most studies undertaken by young students in Ghana. Hence, the CDKN incorporated a mini workshop into the conference with the focus of teaching the participants how to turn their research into a viable business model or a sustainable project. The 40 minutes session involved breaking the audience into groups of 8 comprising averagely 7 people.

Each group was given a specific scenario of the outcome of a fictitious research. The groups were tasked to identify the important takeaways from the research and how a business idea can be realized from it. At the end of the deliberations, each group presented their findings and the linkages between each of the findings were discussed.

Overall, the session was informative and fit its purpose. It highlighted how research can be converted into a business and how young researchers can leverage existing policies and systems to elucidate the findings from their research work.

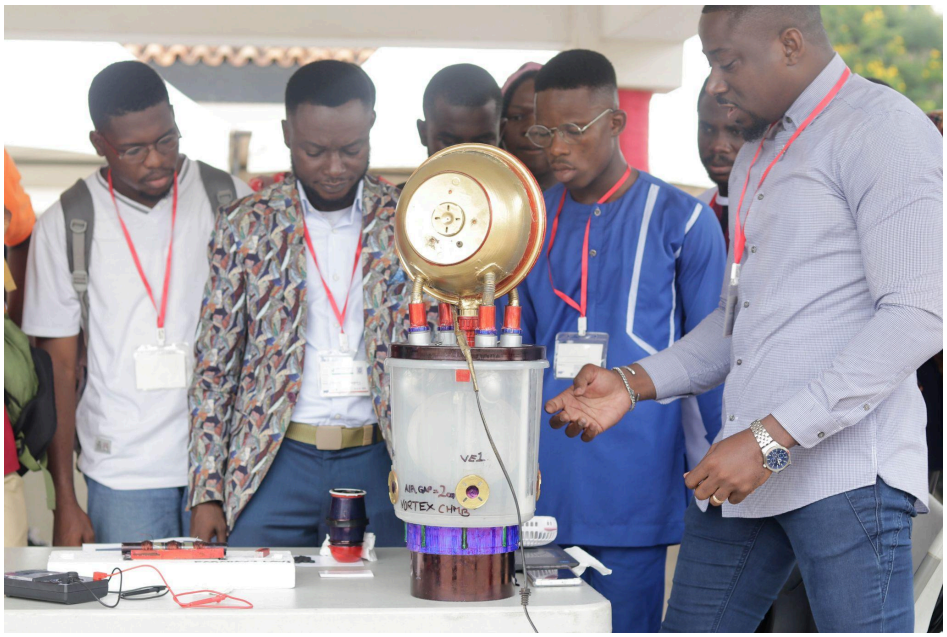
3.10: EXHIBITIONS

The exhibition was a creative way to showcase young people's role in promoting sustainability in Africa. In that regard, the exhibition featured a display of sustainable products and innovative technology from young people within the African continent.

The exhibition occurred concurrently with the proceedings of the conference for the first two days of the conference. 7 exhibitors exhibited their green products and technology on the first two days of the conference.

The exhibition included the display of products like geopolymer concretes, Low-Altitude Magnetic Levitating (MAGLEV) devices, upcycled textile waste, solar technology and green cosmetic products.

Johannes Amo-Aye's exhibition showcased a MAGLEV device. The device functions on the principles of Direct Air Capture (DAC) technology. It works in similitude to the function of the human lungs. It captures air from the environment and absorbs the greenhouse gases from it simultaneously turning a turbine to generate electricity. His device is a testament to how through technology, greenhouse gases can be removed from the environment thus a mitigating approach to climate change.



Inshot: Johannes explains the working mechanism of his device to a group of participants.

The energy efficiency of buildings in Africa has not been given a critical review. In lieu of that, Evans Nartey's Theseus Development Company produces concrete products made from Geopolymer concretes. The representatives explained that the technology increases the energy efficiency of buildings by 50% compared to conventional concrete due to its low thermal conductivity.

Inshot: Display of geopolymer concrete products by representatives of Theseus Development

In our era of fast fashion, pollution of the environment by textile waste has garnered concerns in discussions of environmental activities. In this vein, the Or Foundation and Upcycle it Gh, and GAYO saw the need to upcycle this textile waste into sellable products for the market. Such initiatives, they explained reduce the tens of millions of textiles waste that are dumped into the oceans and environment which subsequently choke up the lives of aquatic habitats.

Inshot: Exhibition of upcycled textile wastes by the Or Foundation.

Inshot: Exhibition of upcycled textile and plastic wastes by GAYO

Inshot: Exhibition of organic bathing gel by GreenBiz made from environmentally friendly products

3.11: CLOSING OF DAY 1

Day 1 closed at 4:45 PM with a closing remark given by Paul Dankwa, the coordinator for the YouSustain Conference. In his remarks, he expressed gratitude to the participants and presenters/exhibitors who made it to the first day of the conference and entreated them to participate in the second and third days of the conference.

Photo Gallery from the first day of the YouSustain Conference

4.0: DAY 2-THURSDAY, 7TH DECEMBER 2023

4.1: ATTENDANCE AND REGISTRATION

The second day of the conference was hosted at the Center for Climate Change and Sustainability Studies (C3SS). Registration started at 8:30 AM. Overall, 130 participants attended the event representing an 8% increase above the anticipated attendance of 120 people. As shown in Figure 3 and Figure 4 below, 62% of the participants were males indicating a 7% decrease from day 1. Females represented 38% of the total participants on the second day as opposed to 31% on the first day. The majority (50%) of the participants were between the age range of 18 - 25 years, followed by those between 15 - 18 years and the remainder between 26 - 36 years and above.

Similar to the first day, the participants consisted of students, young researchers, lecturers, NGO representatives, government officials, lecturers, and conference organizers. The evnt occured in hybrid formats with participant comprising Nigerians, Beninoise, Namibians, Ugandans, and Kenyans.

A parallel session format was adopted for the second day of the conference comprising two break-out sessions with each session focussing on different thematic areas of the conference. Parallel session 1 focused on the following thematic areas:

- Waste management and circular economy
- Education for sustainable development and environmental stewardship
- Urban planning and governance
- Urban transportation and innovation
- Water Supply, Sanitation and Hygiene (WASH).
- Sustainable Energy Transitions

Parallel session two also centred on the following themes:

Agriculture in urban and peri-urban areas, climate-smart agriculture, and sustainable food systems

- Climate adaptation and climate policy
- Climate-related hazards and nature-based solutions

- Conservation and regeneration of urban areas and the implementation of green infrastructure

The second day of the conference did not feature opening speech, keynote speech, and roundtable discussions. It revolved around oral and poster presentations and exhibitions.

Overall, the conference drew together young people with males representing the majority. The higher majority of young people patronizing the conference asserts the enthusiasm of young people towards driving sustainability in sub-Sarahan African cities.

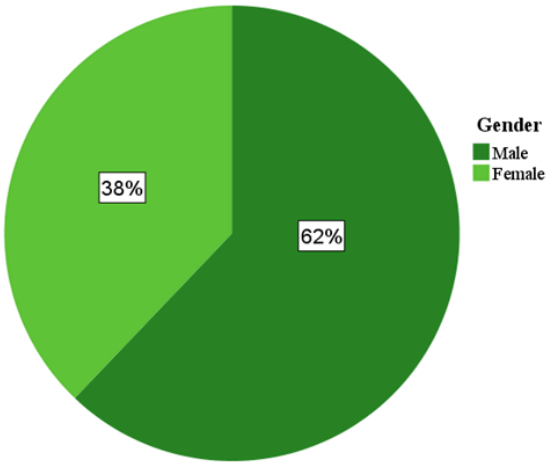


Figure 3. Attendance by gender for day 2

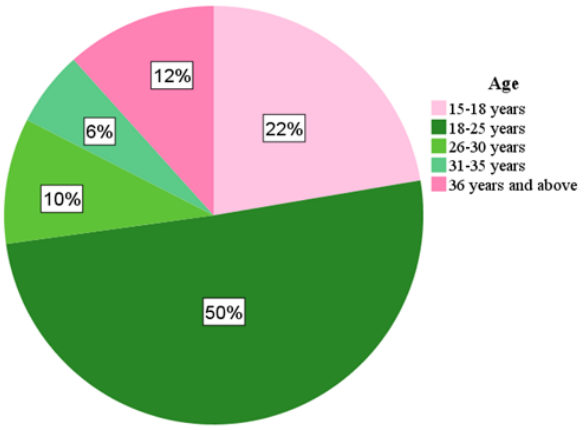


Figure 4: Attendance by age for day 2

4.2: PARALLEL SESSION 1

4.2.1: Research Presentation 1: How effective are climate-smart irrigation strategies in Chereponi, Ghana? Estimation of crop water requirements and irrigation schedules.

Author: Isaac Nevis-Fianoo

Theme: Urban and peri-urban agriculture, climate-smart agriculture and food system

Isaac Nevis-Fianoo's study explores the intersection of climate change, agriculture, and water availability in the Northern Region of Ghana. The study employed the CROPWAT software to analyze irrigation requirements and schedules, aiming to address the challenges posed by shifting climatic conditions on traditional farming practices.

The study revealed that the gross irrigation required for cabbage cultivation within the study area is 805 mm^3. The crop requires 789 mm^3 of water and irrigation of 575.8mm^3. It also showed that the gross irrigation requirement for rice cultivation is 1772.4 mm^3 and the actual irrigation requirement is 650.6 mm^3. The crop needs an optimum quantity of 771.2 mm^3

The study underscores the critical role of investing in irrigation infrastructure for sustainable development, economic growth, and environmental sustainability. The authors recommend Developing a national irrigation plan specifying detailed goals, targets, and timetables for maintaining current irrigation infrastructure and building new dams.

Significance for promoting sustainability in sub-Saharan African cities.

- **Water Resource Management:** By analyzing climate-smart irrigation strategies, the study addresses water availability challenges in agriculture, crucial for sustainable food production.
- **Infrastructure Investment:** The recommendation for a national irrigation plan emphasizes the importance of investing in irrigation infrastructure for sustainable development, economic growth, and environmental sustainability.

4.2.2: Research Presentation 2: Evaluation of the Water Quality and User Perception of Reclaimed Air Conditioner Condensate.

Author: Samuel Nketiah Boateng

Theme: WASH

Samuel Nketiah Boateng's presentation highlighted the potential of using Air Conditioner Condensate for domestic and scientific use. The researcher sampled water from Air conditioners and conducted laboratory analysis on the collected water using WHO standard parameters for water quality. The results were subjected to statistical analysis to determine the underlying quality of the water samples.

The study revealed that the sampled and stored AC water passed the WHO standards for drinking water for all parameters analysed, and the Water Quality Index (WQI) affirmed the findings. The CCMEWQI observed was between 70.69-83.32. The research however observed that comparing the results of the research to the ASTM type 4 standard shows that sampled and stored water failed to meet the 5 µS/cm EC standard by ASTM.

As a potential for creating potential business opportunities, the author recommended business that utilises large numbers of Air Conditioners within their facilities to capture the condensate from their AC instead of purchasing water at a higher cost from Ghana Water Company Limited.

Significance for promoting sustainability in sub-Saharan African cities.

- **Water Resource Diversification:** The study explores an alternative water source (Air Conditioner Condensate) for domestic use, providing a potential solution for water scarcity.
- **Business Opportunities:** Recommending capturing condensate for businesses using air conditioners promotes sustainable water practices and offers potential business opportunities, contributing to economic sustainability.

4.2.3: Research Presentation 3: Empowering Inclusivity: A Just Transition for Persons with Disabilities in Ghana through the Disability Common Fund

Author: Adams Yakubu

Theme: Sustainable Energy Transitions

Persons With Disabilities (PWD) suffer different forms of marginalization. considerable efforts have been made to include PWDs in decision-making. The Paris Agreement's long-term goal of green society presents a new paradigm shift in the world of work; this presents a unique opportunity to provide decent work for persons with disabilities who currently face many socio-economic vulnerabilities in the world of work, and are disproportionately affected by adverse climate change impacts.

Thus, Adams Yakubu's study hinged on identifying the specific challenges encountered by PWDs in accessing energy services in Ghana and proposing innovative strategies for leveraging the Disability Common Fund (DCF) to promote the inclusion and economic empowerment of persons with disabilities in the energy sector.

Preliminary results from the study have revealed that Across eight geographical regions, the Employment-to-Population Ratio (EPR) for persons with disabilities aged 15 years and older is 36% on average, whereas the EPR for persons without disabilities is 60%. It also shows a high rate of misapplication of DCF among Metropolitan, and Municipal, Districts Assemblies. The authors however noted from their review of Upper Denkyira East Municipal PWD records that an amount of GH¢30,825.95 being fund allocated for PWD for the third quarter of 2018 was not received into the PWD account but into the Common Fund account and used for DCF programmes instead of the PWD activities.

Significance for promoting sustainability in sub-Saharan African cities.

- **Social Inclusivity:** The study addresses the challenges faced by persons with disabilities in accessing energy services, proposing strategies for inclusive economic empowerment through the Disability Common Fund.
- **Policy Advocacy:** The findings regarding misapplication of the Disability Common Fund highlight the need for policy adjustments to ensure effective utilization for the intended purposes, contributing to social and economic inclusivity.

4.2.4: Research Presentation 4: Assessment of Past and Future Potential of Ocean Wave Power in the Gulf of Guinea.

Author: Adeola M. Dahunsi

Theme: Sustainable Energy Transitions

The need for migration from fossil fuel-dependent power generation to more renewable means has become pressing as the impacts of climate change continue to increase globally.

Thus, Adeola M. Dahunsi's study estimates the exploitable wave power in the Gulf of Guinea (GoG) for different Wave Energy Converters (WECs) using a combination of numerical methods and power matrices.

Three WECs—Pelamis, AquaBuoy, and Wave Dragon—previously assessed by Guillou and Chapalain (2018), were evaluated for the GoG region. Pelamis is designed for water deeper than 50m and operates as a 750 kW offshore floating machine. AquaBuoy, also for water deeper than 50m, is rated at 250 kW and features a buoy linked to an underwater cylinder. Wave Dragon, designed for water deeper than 30m, has a 5.9 MW rating and uses overtopping for energy conversion.

The study concluded that the assessment has indicated that offshore locations are the most promising for wave energy converter installations, as wave power potential diminishes significantly closer to the coastline, making nearshore exploitation economically unviable.

The findings offer critical information for understanding the feasibility of harnessing wave energy in the GoG and for formulating sustainable energy strategies tailored to the region's unique characteristics.

Significance for promoting sustainability in sub-Saharan African cities.

- **Renewable Energy Potential:** The study evaluates the potential of ocean wave power in the Gulf of Guinea, providing insights into the feasibility of harnessing renewable energy sources in the region.

- **Sustainable Energy Strategies:** The findings offer critical information for formulating sustainable energy strategies, contributing to the transition from fossil fuel-dependent power generation

4.2.5: Research Presentation 5: Design of a sanitising system for enhanced hygiene and safety. Incorporating sanitising features into doors for enhanced hygiene and safety.

Author: Belinda Ofosu

Theme: WASH

Proper WASH practices are imperative to the prevention of sanitary-related diseases like cholera and air-borne diseases like COVID-19. Belinda Ofosu's study on designing a sanitising system for enhanced hygiene and safety incorporated into doors on campus provides a good opportunity for exploring a portable and cost-effective means of combating COVID-19, protecting public health, and creating a safer environment for everyone.

As presented by the author, the mechanism works by fixing a hand sanitiser into a door and using a siphon tube and compressor to connect the sanitiser to a perforated door handle. When the door handle is rotated, the sanitiser is pumped out and sanitizes the door handle and the user's hand simultaneously.

The author concluded that the project had the potential to enhance cleanliness and hygiene during the COVID-19 era and beyond. While the design shows promise in simulations, further physical testing and validation are required to ensure its functionality and efficacy in various environments.

The following recommendations were made:

•Explore different materials and finishes that can enhance the self-sanitizing properties.

• Experiment with various door designs to optimize the sanitization process.

• Consider incorporating sensors or automation features for a more seamless user experience.

•Test and analyze the door's performance in different environments and conditions

Significance for promoting sustainability in sub-Saharan African cities.

- **Public Health and Hygiene:** Designing a sanitizing system for doors contributes to enhanced hygiene and safety, especially in the context of preventing sanitary-related diseases like cholera and COVID-19.
- **Innovation for Health:** The recommendations for testing and further development aim to enhance the effectiveness of the sanitizing system, providing a practical solution for maintaining cleanliness and hygiene.

4.2.6: Research Presentation 6: Unlocking Agricultural and Socioeconomic Prosperity through Green Hydrogen: A Southern African Perspective

Author: Simeon Haumokshi

Theme: Sustainable Energy transitions

Simeon Haumokshi presented virtually. His study on assessing the agricultural and socio-economic prosperity through green hydrogen highlighted the potential of extracting ammonia gas from manure, subsequently reacting it with acid to produce an ammonium sulfate-based fertilizer enriched with nitrogen content for optimal crop growth.

The author explained the use of hydrogen to make ammonium sulfate-based fertilizer has tremendous potential because there are several methods of generating hydrogen from manure including electrolysis and photolysis. The author explained the stages of the process below:

- Green ammonia is reacted with locally available sulfuric acid (to be sourced from Dundee Precious Metal) to produce Green Ammonium Sulfate-based fertilizers.
- The process entails the direct reaction of nitrogen and hydrogen within the reactor, facilitated by a catalyst, resulting in the formation of green ammonia.

Considering the benefits of the project, the author explained the socio-economic benefits as follows:

- A greener agricultural industry provides substantial employment opportunities, reducing unemployment and increasing income levels around Namibia.
- Agriculture necessitates infrastructural development, like roads and storage facilities, benefiting both agriculture and broader community growth.
- Thriving agriculture reduces rural-to-urban migration by providing sustainable livelihoods in rural areas, alleviating strain on urban areas.
- A robust agricultural sector ensures a stable food supply, reducing dependency on imports, promoting economic stability, and enhancing public health.
- Agriculture directly impacts public health by providing nutritious food and indirectly by enabling better access to healthcare through increased income. Sustainable agricultural practices also contribute to a healthier environment.

Significance for promoting sustainability in sub-Saharan African cities.

- **Agricultural Sustainability:** The study explores the extraction of green hydrogen from manure for producing fertilizers, providing a sustainable approach to agriculture.
- **Socio-economic Benefits:** The socio-economic benefits outlined, including employment opportunities, infrastructural development, and stable food supply, highlight the broader impact of sustainable agricultural practices on community prosperity.

4.2.7: Research Presentation 7: A Study of Institutional Responses to Climate Change Vulnerabilities at Slums in Lagos, Nigeria

Author: Dr. James Okolie-Osemene

Theme: Climate adaptation and climate policy

Extensive flooding, leading to disease outbreaks are amongst the negative impcats climate change has had in Lagos State Nigeria especially in the slum areas.

Dr James Okoli-Osemene's research examines ways of enhancing the daily life experiences in slums around Lagos Lagoon and how political agenda for pro-poor policies could empower residents to adapt to the changing climate in view of security implications arising from resource competition.

The study revealed that:

- Security issues in Lagos slums are linked to resource competition resulting from climate change vulnerabilities.
- Approximately 65% of the urban poor reside in Lagos slums, facing challenges due to rapid population growth resulting from rural-urban migration.
- Government interventions in slums involve coordinating with slum dwellers' associations, providing social amenities, and initiating development projects.
- Youth leadership plays a crucial role in climate adaptation, focusing on actions like refuse disposal, sewage control, and protecting the environment from waterlogging.
- Pro-poor policies are essential for preventing forced eviction without humane resettlement plans, addressing climate change fears, and mitigating .

The paper emphasizes the need for collaborative efforts between government and communities to address climate change challenges.

Significance for promoting sustainability in sub-Saharan African cities.

- **Informed Policy Development:** The study provides valuable insights into the security implications of climate change vulnerabilities in slums, allowing policymakers to develop informed and targeted policies that address the specific challenges faced by vulnerable populations.
- **Enhanced Institutional Responses:** Understanding the institutional responses to climate vulnerabilities, including government interventions and youth-led actions, can guide

authorities in improving and tailoring their strategies. This can result in more effective disaster prevention, community development, and environmental protection initiatives.

- **Pro-Poor Policy Implementation:** The research emphasizes the importance of political agendas for pro-poor policies, especially in the context of housing challenges and forced evictions. Implementing these policies can prevent displacement, provide humane resettlement plans, and alleviate fears arising from climate change and disruptions in informal settlements.
- **Population Dynamics and Urban Planning:** The study sheds light on the impact of rapid rural-urban migration and the resulting informal settlements. Policymakers can use this information to develop sustainable urban planning strategies that accommodate growing populations, ensuring the availability of basic amenities and infrastructure.

4.3: PARALLEL SESSION 2

4.3.1: Research Presentation 1: Integration of trees on farms by smallholder farmers in the Atwima Mponua District.

Author: Paulina Amenyona

Theme: Climate adaptation and climate policy

Paulina's presentation highlighted climate-smart agriculture as a crucial strategy for carbon sequestration while simultaneously ensuring food security. Her study revealed that the willingness of smallholder farmers to incorporate tree farming is hindered by concerns over tree ownership. Government claims of these trees often lead to reluctance among farmers to maintain them, sometimes resulting in the deliberate removal of high-value trees.

The core issue lies in farmers' perception that, ultimately, these trees belong to the government rather than to them. This situation undermines the potential environmental benefits these trees could provide. To address this, Paulina recommends a collaborative approach where extension officers work closely with relevant stakeholders. This collaboration aims to educate farmers about the myriad benefits of preserving trees, such as their role in sequestering atmospheric carbon.

Furthermore, Paulina emphasized the significance of tree farming in achieving the 2030 global environmental targets. The need to maintain and preserve trees is not only for their immediate environmental benefits but also for their contribution to long-term ecological goals. Educating farmers about these benefits can foster a more sustainable and cooperative approach to tree farming, aligning individual efforts with global environmental objectives.

Significance for promoting sustainability in sub-Saharan African cities.

- **Climate-Smart Agriculture**: The study emphasizes climate-smart agriculture as a strategy for carbon sequestration and food security.
- **Community Collaboration**: Recommending a collaborative approach involving extension officers and stakeholders addresses farmers' concerns and fosters a sense of ownership, promoting sustainable tree farming practices.

Inshot: Paulina Amenyona delivering her presentation.

4.3.2: Research Presentation 2: Influence of Climate Change, Environmental Degradation, and Natural Resource Scarcity on Herder-Farmer Conflict in the West Mamprusi Municipality of Ghana.

Author: John Peter Okoro

Theme: Climate adaptation and climate policy

In John Peter Okoro's insightful presentation, he delved into the increasing conflicts between herders and farmers in the West Mamprusi District. He convincingly argued that climate change is a major culprit, leading to the shrinkage of agricultural lands and forcing herders inland. This shift, as Okoro pointed out, intensifies resource competition and ignites conflicts, a real-life illustration of the environmental security theory.

In his presentation, he juxtaposed climate change's impact on farmers and herders. His presentation pointed out that the changing climate causes a decline in crop harvest and profits. The same menace forces cattle herders to scout more areas for water and hence leads them into direct conflict with the farmers. He presented empirical evidence of how climate change has impacted arable lands within the study area by showing aerial images of the area over 20 years. The images revealed a stark decline in tree canopy within the study area highlighting the deleterious effects of climate change.

Significance for promoting sustainability in sub-Saharan African cities.

- **Climate Change Impact**: The presentation highlights the role of climate change in triggering conflicts between herders and farmers, showcasing the real-world implications of environmental changes.
- **Empirical Evidence**: The use of aerial images provides tangible evidence of climate change effects on arable lands, enhancing the understanding of environmental degradation leading to conflicts.

Inshot: John Peter Okoro delivering his presentation

4.3.3: Research Presentation 3: Assessing the Benefits of Mangroves in Flood Reduction in the Coastal Communities of Rivers State Using InVEST Coastal Vulnerability Model

Author: Chinomnso Onwubiko

Theme: Climate-related hazards and nature-based solutions

Chinomso's presentation was an eye-opener on the plight of coastal communities facing climate change. She presented compelling evidence on how mangroves serve as vital flood barriers. She advocated for the use of the InVEST CV model as an effective means of reducing flood in coastal communities around the world as proven in her ongoing study. She believes that a nature-based solution is one of the effective ways of managing and adequately preparing for disasters once implemented.

Significance for promoting sustainability in sub-Saharan African cities.

- **Nature-Based Solutions**: The study advocates for the use of mangroves as nature-based solutions to reduce flooding in coastal communities.
- **Scientific Modeling**: Utilizing the InVEST Coastal Vulnerability Model provides a scientific basis for understanding the benefits of mangroves in flood reduction, facilitating informed decision-making.

4.3.4: Research Presentation 4: Sustainable agriculture practices

Author: Oscar Bilabam

Theme: Urban and peri-urban agriculture, climate-smart agriculture and food system

Oscar Bilabam presenting his envisaged project on sustainable agricultural practices in Ghana described Ghana's agricultural sector's struggles with climate change and erratic rainfall patterns. He proposed that the adoption of agroecology in farming practices can be seen as a practical and forward-thinking solution to bolster agricultural resilience and conservation.

He explained that in their efforts to promote sustainable agricultural practices within their study area, his project will employ drones, sensors, and data analytics to monitor crop health and yields, optimize resource utilisation, and enhance overall efficiency.

Significance for promoting sustainability in sub-Saharan African cities.

- **Agroecology Adoption:** Proposing agroecology as a solution for climate-resilient farming practices addresses challenges posed by climate change and erratic rainfall patterns.
- **Technology Integration:** The use of drones, sensors, and data analytics demonstrates an innovative approach to monitoring and optimising agricultural practices for sustainability.

4.3.5: Research Presentation 5: Creating Sustainable Waste Management through Compost in the Kassena-Nankana West Municipal

Author: Thomas Abugah

Theme: Waste management and circular economy

Improper waste management in sub-Saharan African cities is a challenge faced by almost all city authorities. Thus, Thomas Abugah's research set out to assess and provide a comprehensive understanding of the current state of composting in households across the Kassena-Nankana Municipality.

The outcome revealed that 85% of their study participants were aware of the different composting methods. It also showed that kitchen scraps, yard trimmings, and agricultural residues were the types of organic waste composted.

His study also revealed, that despite the non-existence of any NGOs within their target communities training the community members, a significant majority of them were practising pit composting. However, 82% of the respondents were not previewed to the benefits of composting.

The authors proposed implementing a compost system as an effective and sustainable way to manage organic waste within the study area.

Significance for promoting sustainability in sub-Saharan African cities.

- **Community Awareness:** The study assesses the current state of composting in households, emphasizing community awareness and practices in waste management.
- **Recommendations for Improvement:** Proposing the implementation of a compost system suggests practical steps for enhancing organic waste management in the study area.

4.3.6: Research Presentation 6: A comprehensive framework for estimating the rate of mining-induced climate change in Ghana.

Author: Stephen Kwaning Amoako

Theme: Climate-related hazards and nature-based solutions

While the mining sector plays a significant role in economic development, its environmental impacts cannot be overlooked. As such, there is a need for a comprehensive framework to ensure environmentally responsible mining practices as a crucial step for sustainable development.

Stephen Kwaning Amoako's study aimed at estimating the GHG emissions from mining activities in Ghana comparing them with the emissions from other sectors and sources in Ghana and assessing the impacts and risks of mining-induced climate change on the climate system and the environment in Ghana.

The study revealed that the mining sector contributes about 4.27 MtCO2e representing 7.285 % of all greenhouse house emissions in Ghana annually. Putting the results into perspective, the author asserted that this emission is equivalent to the carbon sequestered by 70,000,000 tree seedlings grown for 10 years using the US EPA's greenhouse gas equivalencies calculator. He added that the shifts in temperature and precipitation patterns may impact the habitats and migration patterns of various species, potentially leading to a loss of biodiversity.

The author concluded that electricity generation was found to be responsible for the highest greenhouse gas emissions.

He recommended integrating renewable energy sources into the mining sector's energy mix while exploring carbon capture and storage technologies. He also advocated for Strengthening environmental impact assessment while increasing transparency in emissions reports.

Significance for promoting sustainability in sub-Saharan African cities.

- **Environmental Impact Assessment**: The comprehensive framework for estimating mining-induced climate change emphasizes the importance of responsible mining practices.
- **Renewable Energy Integration**: Recommendations for integrating renewable energy into the mining sector's energy mix align with sustainability goals and reduce environmental impacts.

4.3.7: Research Presentation 7: Linking Education with Sustainable Development In Uganda: A Case of the New Lower Secondary School Competence-Based Curriculum Implementation Approaches for Sustainable Development in Selected Schools of Kabale District.

Author: Innocent Muhwezi

Theme: Education for sustainable development and environmental stewardship

Incorporating Sustainable Development Goals into the academic curriculum is proven to be an effective method of getting young people on board in the promotion of sustainability in Africa.

Innocent Muhwezi's study on the linkages between education and sustainable development in Uganda examined the new Lower Secondary School Competence-Based Curriculum approaches that enhance sustainable development in the Kabale District, Uganda.

The study highlighted the new competency-based curriculum to the sustainable development goals and investigated the links between the two.

The study revealed that there has been the incorporation of some of the sustainable development goals (i.e. Goal 4, Goal 5, and Goal 6) into the schools' curriculum.

Assessing the feasibility of these initiatives, Innocent recommended that teachers be trained to grasp the implementation of the SDGs properly and also make teaching the SDGs more engaging for the learners.

Significance for promoting sustainability in sub-Saharan African cities.

- **Incorporating SDGs in Education**: The study explores the incorporation of Sustainable Development Goals (SDGs) into the academic curriculum, fostering awareness and understanding among students.
- **Teacher Training:** Recommending teacher training for proper SDG implementation reflects the importance of educators in promoting sustainability.

4.3.8: Research Presentation 8: Neglected Resource

Author: Ernest Safo Opoku-Mensah

Theme: Urban and peri-urban agriculture, climate-smart agriculture and food system

Converting organic waste to generate compost, protein meal, animal nutrition, and hygiene products provide a good potential for creating viable business opportunities for young people who are enthusiastic about developing viable ecopreneur businesses.

Ernest Safo-Mensah's presentation on his project titled "Neglected Resources" sought to address just that. In his presentation, he explained that access to innovative cutting-edge technology and training could help young Ghanaians convert organic waste into insect-based products for the Ghanaian agricultural, biotech, poultry, fishery and livestock industries.

He explained that his organization utilise organic waste that could be dumped unto landfill sites to process mealworms, palm weevil larvae and Black Soldier Fly larvae into protein meal, animal nutrition products, compost, and hygiene products.

Prior feasibility studies from the project indicate that people within the target communities of the project are extremely interested in segregating their organic waste. This is promising as it will serve as the raw for production.

Highlighting the challenges, Ernest explained that the high cost of storage dustbins, labour cost for collection of waste, and transportation limits hamper the implementation of the project.

Significance for promoting sustainability in sub-Saharan African cities.

- **Circular Economy:** The project focuses on converting organic waste into valuable products, aligning with the principles of a circular economy.
- **Youth Ecopreneurship:** Addressing the potential for creating business opportunities for young people in waste conversion promotes youth ecopreneurship and sustainable practices.

4.4: REMARKS ON THE SECOND DAY OF THE CONFERENCE

The conference underscored the interconnectedness of youth involvement with the achievement of sustainable development goals. Emphasis was placed on youth ecopreneurship as a means to address environmental issues innovatively. The need for capacity building, partnership, and collaboration was highlighted as essential in eradicating poverty and achieving actionable solutions on a continental scale to combat the climate crisis.

Inshot: Photo gallery from the second day of the conference.

5.0: Day 3

5.1: Registration and attendance

Due to the smaller capacity of the facilities at the Or Foundation, only 80 people were selected to attend the field trip on the third day. These people included registered participants, presenters, exhibitors, and conference organisers. Registration on the conference's third day started at 7:30 AM

at the Center for Climate Change and Sustainability Studies (C3SS). 55% of the registered participants were females and the remaining 45% were males. 50% of the participants were within the age range of 18-25 years, 30% were between the ages of 15-18 years and the remaining percentages were occupied by people above 25. Two 50-seater buses were provided by the organizers for the trip to the Or Foundation at Accra Central.

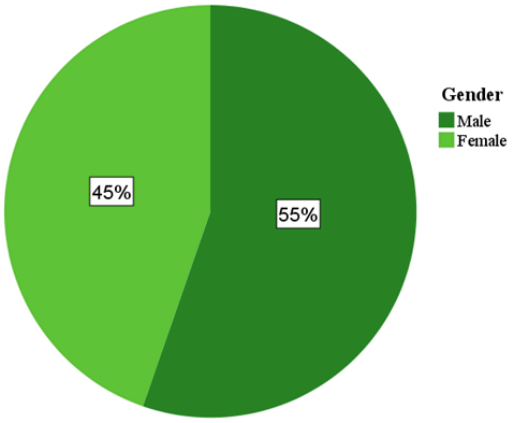


Figure 5. Attendance by gender for day 3

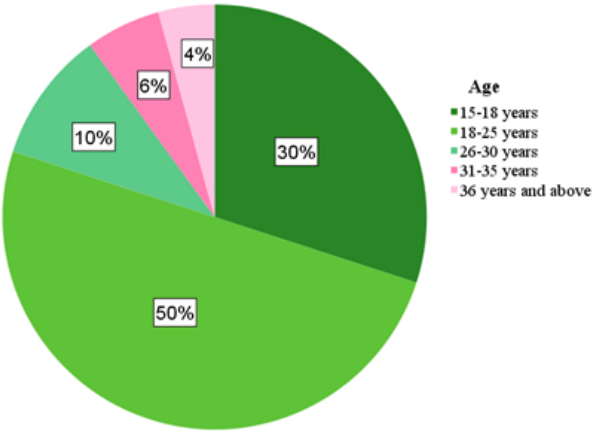


Figure 6: Attendance by age for day 3

Inshot: Pictures of some participants on the third day of the conference.

5.2: At the Or Foundation

Attendees arrived at the Or Foundation at 9:00 AM. At the Or Foundation, participants were met by Miss Liz Branson, Miss Chloe Asaam, and Mr Joseph Zotoo of the Or Foundation. The participants were briefed on the purpose of the gathering which was to showcase how their fellow young people have been contributing to the promotion of sustainability in African cities through upscaling of textile waste.

After the introduction, the participants were split into two groups where a group was taken to the warehouse of the Or Foundation and another group to the showroom and offices of the Or Foundation.

Inshot: Pictures of the briefing session at the Or Foundation

5.3: At the Warehouse

20 participants were taken to the warehouse of the Or Foundation after the briefing session at the office. The reason for selecting 20 people for the warehouse is due to the smaller size of the warehouse and safety reasons. Participants who were taken to the warehouse were mostly students. They were taken through the steps of shredding textile waste materials, treating them and converting them into reusable and sellable materials. The participants had first-hand experience of how things are done through practical demonstrations.

5.4: At the showroom

At the showroom, participants were taken through a lot of activities. These activities included producing door mats from textile waste, repurposing textile waste, and making artefacts from textile waste. Mr Joseph Zotoo explained to the participants what the Or Foundation does and how they have been extracting thousands of tons of textile waste from the oceans in Accra annually.

Miss Chloe Asaam highlighted the pathways the participants can also contribute to the prevention of waste in the environment in Ghana. She posited that if young Ghanaians can cut down on their appetite for fast fashion and patronize more Ghanaian-made fabrics, the rate of pollution of the ocean and the environment with textile waste will be reduced.

The event concluded with a Q&A session between the participants and the host after which both sides expressed their appreciation for making the meeting possible.

Inshot, Phot gallery from the third day of the conference:

6.0: CONCLUSION

The YouSustain Conference served as a pivotal platform for addressing the urgent need to integrate sustainable practices into the urban landscape of sub-Saharan African cities, particularly in the face of increasing youth population and exacerbating climate challenges. The conference successfully convened a diverse group of participants, including young entrepreneurs, researchers, and development agencies, fostering a rich exchange of ideas and solutions for promoting ecopreneurship and urban sustainability.

Throughout the conference, various sessions, such as keynote speeches, roundtable discussions, spotlight presentations, and poster exhibitions, elucidated the multifaceted nature of challenges and opportunities in the pursuit of sustainable urban development in sub-Saharan Africa. Notably, the emphasis on youth-led initiatives, as exemplified by the diverse range of ecopreneurial projects displayed, demonstrated the immense potential of young people in driving positive change on the African continent.

The inclusion of practical workshops, such as the Research into Action session by the Climate and Development Knowledge Network (CDKN), underscored the importance of translating research findings into actionable business models. This hands-on approach not only added a pragmatic dimension to the conference but also empowered participants to envision tangible solutions grounded in their research.

The generous provision of travel and accommodation grants, especially for participants from regions farther afield, exemplifies the commitment of the organizers to inclusivity and accessibility. This support facilitated a diverse and representative attendance, enriching the discourse with perspectives from various regions and backgrounds.

The spotlight presentations and poster exhibitions showcased innovative solutions, ranging from geopolymer technology for urban conservation to integrating IoT for sustainable biogas production.

These initiatives not only contribute to environmental sustainability but also hold the potential for economic growth and job creation, aligning with the broader goals of sustainable development.

Summing it up, the YouSustain Conference has not only identified key challenges in urban sustainability but has also highlighted a path forward. The collaborative spirit, knowledge-sharing, and practical insights gained from the conference provide a solid foundation for fostering ecopreneurship, sustainable urban development, and a resilient future for sub-Saharan African cities. The initiatives presented and the partnerships forged during this conference are crucial steps toward building a more sustainable and equitable future for the continent.