

INSTITUTE FOR ENVIRONMENT AND SANITATION STUDIES (IESS)

UNIVERSITY OF GHANA

# REPORT ON ENVIRONMENT, CLIMATE CHANGE AND HEALTH (ENCLIMAH) CONFERENCE

(October 12<sup>th</sup>, 2022 – October 13<sup>th</sup>, 2022)



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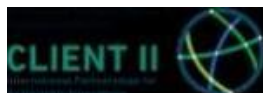
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## Table of Contents

<b>1.0 Introduction.....</b>	<b>3</b>
<b>2.0 Summary of Day One of Environment, Climate Change and Health Conference (12<sup>th</sup> October, 2022).....</b>	<b>3</b>
Panel Discussion.....	6
Hall A .....	10
Hall B.....	13
Hall C.....	15
<b>3.0 Summary of Day Two of Environment, Climate Change and Health Conference (13<sup>th</sup> October, 2022).....</b>	<b>18</b>

## List of Figures

<b>Figure 1a:</b> Dr. Benedicta Fosu-Mensah – Master of Program.....	<b>4</b>
<b>Figure 1b:</b> Prof. Kwasi Appeaning Addo Giving Opening Remarks for the Conference.....	<b>4</b>
<b>Figure 1c:</b> Prof. Boateng Onwona-Agyeman Giving A Speech.....	<b>5</b>
<b>Figure 1d:</b> Dr. Samuel Koranteng Giving Overview of Conference.....	<b>5</b>
<b>Figure 1e:</b> Dr. Eugene Owusu Delivering A Speech.....	<b>5</b>
<b>Figure 1f:</b> A Section of Participants During Conference.....	<b>5</b>
<b>Figure 1g:</b> A Group Picture of all Participants During Coffee Break.....	<b>6</b>
<b>Figure 2a:</b> Dr. Daniel Nukpezah Moderating Panel Discussion.....	<b>7</b>
<b>Figure 2b:</b> Prof. Chris Gordon Contributing to the Panel Discussion.....	<b>7</b>
<b>Figure 2c:</b> Prof. George Armah Contributing to the Panel Discussion.....	<b>8</b>
<b>Figure 2d:</b> Ms. Delia Bando Contributing to the Panel Discussion.....	<b>8</b>
<b>Figure 2e:</b> Mr. Charles Asabre Contributing to the Panel Discussion.....	<b>9</b>
<b>Figure 2f:</b> Dr. Winfred Nelson Contributing to the Panel Discussion.....	<b>9</b>
<b>Figure 2g:</b> Panel Discussion.....	<b>10</b>
<b>Figures 3a – 3f:</b> Activities in Hall A.....	<b>13</b>
<b>Figures 4a – 4b:</b> Activities in Hall B.....	<b>15</b>
<b>Figures 5a – 5f:</b> Activities in Hall C.....	<b>18</b>

## **1.0 Introduction**

The 2022 Environment, Climate Change and Health (ENCLIMAH) Conference was held on October 12<sup>th</sup>, 2022 to October 13<sup>th</sup>, 2022 at the Institute for Environment and Sanitation Studies (IESS) – International House at the University of Ghana. The conference convened persons from diverse sectors to discuss issues pertaining to the environment, climate change and health. It drew on the knowledge and expertise of key stakeholders to discuss current environmental challenges and to propose insightful recommendations to tackle these challenges. The conference was held both online and in-person on the first day and solely online on the second day. Highlights of the conference included a panel discussion as well as oral presentations on abstracts and papers pertaining to selected themes under environment, climate change and health. There were also in-person poster exhibitions and online poster presentations.

## **2.0 Summary of Day One of Environment, Climate Change and Health Conference (12<sup>th</sup> October, 2022)**

The first day of the Environment, Climate Change and Health (ENCLIMAH) conference began at 9:00 am. It was held both in-person and via zoom. The conference started with the Master of Programme, Dr. Benedicta Fosu-Mensah welcoming all participants to the conference. By 9:20 am, welcome and opening remarks were given by the Director of the Institute for Environment and Sanitation Studies, Prof. Kwasi Appeaning Addo. This was followed by remarks by the Provost for the College of Basic and Applied Sciences, Prof. Boateng Onwona-Agyeman. In his speech, he emphasised the contribution of gas emissions from vehicles to climate change. He mentioned that the high sulphur content in fuel used in Ghana coupled with weak catalytic converters of several vehicles in use in Ghana leads to the release of toxic gases into the atmosphere which are detrimental to the climate. Prof. Onwona-Agyeman named hydrogen and electric-powered vehicles as more climate-friendly vehicles which can be used in Ghana. The Conference Chair, Dr. Samuel Koranteng subsequently provided an overview of the conference. In his speech, he mentioned that, one key issue which this year's conference seeks to explore is the Environment-Climate-Health nexus. He highlighted that the World Health Organisation (WHO) estimates that, over 12 million people around the world die annually from living or working in unhealthy environments. He also emphasised on the need to view and preserve the

environment as a vital element for the protection of health in order to ensure great benefits to the health of all persons. At 9:54 am, Dr. Benedicta Fosu-Mensah introduced the Guest of Honour, Dr. Eugene Owusu who is the Special Advisor to the President on the Sustainable Development Goals (SDGs). Dr. Owusu spoke about the problems associated with climate change and environmental degradation such as air pollution, degradation of coral reefs and mangroves, sea level rise, water scarcity, health crisis, amongst others which are presently evident worldwide. He stated that these are occurring as a result of negative human activities. He also stated that sustainable and prudent measures have to be put in place to curb these adverse human activities for the protection of the environment and climate from irreversible damage and also for the protection of the present and future generations. There was a coffee break at 10:15 am after the speech by the Guest of Honour. Figures 1a to 1g show images of activities which took place in the first session of the first day of the conference.



**Figure 1a: Dr. Benedicta Fosu-Mensah – Master of Program**



**Figure 1b: Prof. Kwasi Appeaning Addo Giving Opening Remarks for the Conference**



**Figure 1c: Prof. Boateng Onwona-Agyeman Giving A Speech**



**Figure 1d: Dr. Samuel Koranteng Giving Overview of Conference**



**Figure 1e: Dr. Eugene Owusu Delivering A Speech**



**Figure 1f: A Section of Participants During Conference**





**Figure 1g: A Group Picture of all Participants During Coffee Break**

### Panel Discussion

At 10:40 am, a panel discussion on the topic: ‘The Climate-Sanitation-Health Nexus: Policy Implications’ began. The giving of an overview and moderation of the session were carried out by Dr. Daniel Nukpezah, a senior research fellow of the Institute for Environment and Sanitation Studies (IESS). The members of the panel were Prof. Chris Gordon, the founding director of the Institute for Environment and Sanitation Studies (IESS), Prof. George Armah of the Noguchi Memorial Institute (University of Ghana), Dr. Winfred Nelson of the National Development Planning Commission, Ms. Delia Bando of the School of Public Health (University of Ghana) and Mr. Charles Asabre of the Ga East Municipal Assembly. It was established in the panel discussion that there is indeed an interconnection between climate, sanitation and health. Figure 2a shows Dr. Daniel Nukpezah moderating the panel discussion.



**Figure 2a: Dr. Daniel Nukpezah Moderating Panel Discussion**

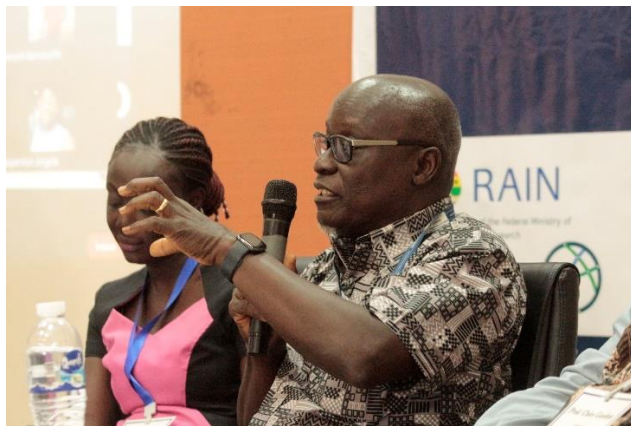
Prof. Chris Gordon stated in his submission that climate change is a consequence of human activities. He mentioned that some of the consequences of climate change are the unpredictable change in rainfall pattern and the increase in temperature which pose a threat to food security. Another consequence of climate change which he raised is the occurrence of droughts. He emphasised that Ghana is not well-adapted to climate change and this is evident in detrimental practices like the use of vehicles with internal combustion engines and the construction of buildings in waterways. Figure 2b shows a picture of Prof. Chris Gordon contributing to the panel discussion.



**Figure 2b: Prof. Chris Gordon Contributing to the Panel Discussion**



Prof. George Armah spoke about the health implications associated with climate change. He made mention of diarrhoea and meningitis as being among climate change related diseases. He also said that diarrhoea has a seasonal pattern. Ms. Bandoh in her submission reiterated the link between the climate and human wellbeing. Apart from diarrhoea and meningitis, she mentioned malaria as another climate-sensitive disease. She added that climate change is causing meningitis to occur outside the meningitis belt. Furthermore, she spoke about how climate change related food insecurity can cause malnutrition. She also established the link between health and economic productivity. She again added that climate resilience measures need to be put in place to curb these health concerns. Figure 2c and 2d show Prof. George Armah and Ms. Delia Bandoh respectively contributing to the panel discussion.



**Figure 2c: Prof. George Armah Contributing to the Panel Discussion**



**Figure 2d: Ms. Delia Bandoh Contributing to the Panel Discussion**

Mr. Charles Asabre spoke about the poor sanitation practices prevalent in various municipalities in Ghana such as open burning of waste and improperly engineered landfill sites which lead to the emission of particulate matter as well as toxic gases into the atmosphere; thereby contributing to climate change. He added that many dump sites are left unattended to after their lifespan. Mr. Asabre also mentioned that the current policies on climate resilience are ineffective in terms of their implementation. He stated that it would be advantageous for households to own individual compost systems for transforming organic waste into compost for enriching soil for cultivation of crops. Figure 2e below shows Mr. Charles Asabre contributing to the panel discussion.



**Figure 2e: Mr. Charles Asabre Contributing to the Panel Discussion**

Dr. Winfred Nelson shed light on aspects of the Medium-Term and Long-Term Development Plans of Ghana which focus on issues regarding climate, environment and health. He however stated that there is the problem of operationalisation of these aspects of the Medium-Term and Long-Term Development Plans. He also added that there is the lack of proper systems to monitor their implementation. Figure 2f shows Dr. Winfred Nelson making contributions during the panel discussion.



**Figure 2f: Dr. Winfred Nelson Contributing to the Panel Discussion**

The panel discussion ended with the following recommendations: there should be a multi-sectoral approach in tackling climate change issues; politicians and policymakers must be convinced on the extent of impact of climate change on sanitation and health, there has to be attitudinal change on the part of all members of society and there should be increased investment in the enforcement of climate-related policies. Figure 2g shows a picture of all the panelists and the moderator during the panel discussion.



**Figure 2g: Panel Discussion**

After the panel discussion, participants of the conference were asked to go into various breakout rooms based on their preference and/or skillset for oral presentations on various written papers and abstracts. The breakout sessions were held simultaneously in two different halls (Hall A and B) and a symposium on Coastal Community Resilience to Climate and Diarrhoea (C2R-CD) Project was held in another hall (Hall C). The oral presentations began at 12:15 pm.

### Hall A

The oral presentation session for Hall A commenced at 12:27 pm led by Mr. Rowland Apambilla while Dr. Benedicta Fosu-Mensah (main moderator) and Dr. Opoku-Pabi chaired the meeting. Participants were each given twenty-five (25) minutes to present and afterwards, a question and

answer (Q/A) period was permitted. However, considering the number of participants present coupled with the need to stay within the time frame, the moderator entreated listeners to note down their questions and once presentations were completed, have all questions and suggestions addressed subsequently.

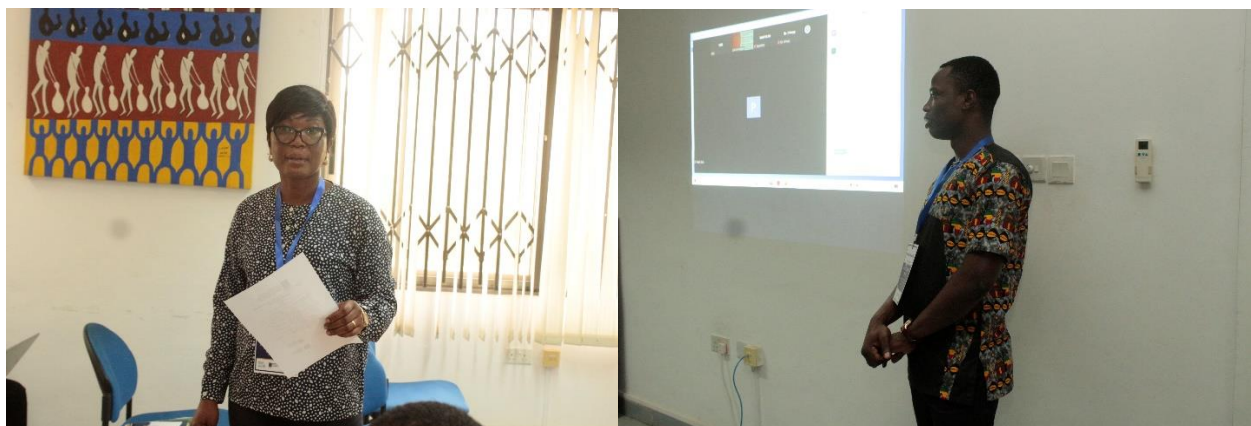
In all, five (5) presentations were done in Hall A and afterwards, the co-chair (Dr. Opoku-Pabi) together with the main chair handled the Q/A session during which some were admonished to revisit their work while concerns were addressed. For the last participant (Ms. Salwar Omar Gyabo) who presented on the research topic; ‘Towards Industrial Ecology: An Assessment of Environmental Practices within the Plastic Industry in Accra, Ghana’, she was admonished to include synergies (correlation) for her variables which included EMS, locality, diversity, amongst others. Meanwhile, Madam Charlotte Chapman-Wardy who presented on the research title; ‘Modelling the Amount of Waste Generated by Households in the Greater Accra Region using Artificial Neural Network’ was encouraged to include per capita variable in her research work of which she explained that she will seek out funding since she was financially constrained at some point. She highlighted a major challenge which was the heterogeneity of waste at the dumpsite as far as Industrial Ecology was concerned. She also stated that she had to go to various households to extract waste instead.

More Q/As continued. Mr. Yaw Owiredu Mante who presented on ‘The Design and Construction of a Portable Water Purification System Model using Locally Available Materials’ was asked a question concerning the challenge posed by the use of biochure in addressing a societal challenge. He debunked the argument and emphatically stated the essence of biochure in reducing coconut husk and attaining sustainability since it adds value to waste (Reuse). Moreover, Dr. Nukpezah added that, it was necessary for students to research into that domain and assess the impact of net biochure for producing water using the life cycle analysis (LCA). Dr. Nukpezah related it to the initial acceptance of *Jatropha curcas*; a plant; which was earlier hailed for its various medicinal uses and later revealed to impact food security. This reiterated a statement made by a panelist (Prof. Chris Gordon) during the previous session that, climate change is a wicked problem further creating problems in an attempt to address pressing global challenges (maladaptation).

When asked why she used the model, Madam Chapman-Wardy explained that, the model learnt from future inclusions and consequently auto-corrected itself (Machine learning) giving off perfect

results. Also, similar to e-learning, it employed an iterative approach. Mr. Stephen Yeboah Owusu who presented on ‘Industrial Ecology Practice among Selected Enterprises in the Agro-Food Value Chain in Ghana’ was also not spared and asked why some enterprises were less than others although he mentioned that a sample size of 80 industries was considered for the research. Mr. Owusu explained that, it was as a result of interactions among the industries along the agri-value chain and not necessarily all enterprises present within Accra and Tema but how well both food and alcoholic industries inter-related with each other. On the hand, Mr. Apambilla was asked to explain the use of his sample size and the reason for his study area which he explained that for his sample size, he used the Slovin’s sampling method giving him the sample size he used. For his study area, he stated that he identified a major research gap for the three districts with regards to ecosystem services.

The moderator thanked the presenters and all members present for their active participation and advised presenters to acknowledge contributions and suggestions given out by the audience for more accurate papers for future publication. The oral presentations for Hall A ended at 2:31 pm. Figures 3a to 3f show images of oral presentations and other related activities that occurred in Hall A.







**Figures 3a – 3f: Activities in Hall A**

## Hall B

The session began at 12:30 pm with a welcome address by the present chair (Dr. Philip-Neri Jayson-Quashigah). In his address, he briefly addressed the participants present on the purpose of the session and also introduced the presenters and their respective topics.

Out of the four (4) expected presentations, two were present. However, Mr. Joseph Ayitiah represented Ms. Cecelia Datsa for the first presentation. Mr. Ayitiah presented on the topic; ‘Sanitation Response During COVID-19 pandemic’. In his presentation, he stated that the objective was to point out some concerns of hygienic practices of two markets in the Greater Accra Region - the Dome and Tema Community One (1) markets. After his presentation, concerns were raised on:



- why his research was not expanded to include consumers who also came to the markets to buy during the pandemic.
- why the managers of the toilet and sanitary facilities were not also interviewed.

Mr. Ayitiah responded by citing time constraint as his reason. The chair of the session advised that his research should be revisited and try to address some of the concerns in order to make the study a true representation of the topic.

The next presentation was done by Mr. Emmanuel Owusu on the topic ‘Variables of Flood Risks Dimension among Households in the Greater Accra Metropolitan Area.’ The objective of his study was to evaluate the vulnerability levels of these households and the ways to strengthen individuals living in flood prone areas to become resilient to the dangers of flooding.

His presentation was adjudged by the chairperson and the senior faculty member present to be an interesting topic. He was encouraged to also expand his study to cover external factors such as:

- drainage sources to the communities under study.
- the already existing adaptation capacity in those areas and the entity providing that capacity.
- and finally, to reconsider the use of the 2010 Population and Housing Census data for his analysis. He was advised to use the data from the 2021 Population and Housing Census since that reflects the population and household data at the time the study was being carried out.

The final presentation was more of a lecture on the need to consider Archaeology in the discussion of climate change issues. The presentation was done by Mr. Samuel Amartey on the topic ‘Climate Change Archaeology of Ghana: Possibilities and Prospects’. In his brief presentation, Mr. Amartey explained how human activities in the past were used to tackle some of the current climate change issues that seem to have no solutions. He also advocated for the Institute for Environment and Sanitation Studies (IESS) to consider including Archaeology and its relation to Environment, Sustainability and Sanitation issues in their academic curriculum.

After his presentation, the participants together with the chair agreed on suggesting the topic ‘The Role of Religion and its impact on Environmental Issues’ to the coordinators of the conference.

The chair thanked all participants present and beseeched them to all be practical in the quest to solve and mitigate environmental issues. He also congratulated the coordinators of the

Environment, Climate Change and Health (ENCLIMAH) Conference for organising such an educative and insightful conference.

At 1:44 pm, the session in Hall B ended pending interactions among participants and the closure of the sessions in the other halls (Halls A and C). Figures 4a and 4b show activities that took place in Hall B.



**Figures 4a and 4b: Activities in Hall B**

### Hall C

The session at Hall C commenced at 12:30 pm. The session in this hall was dedicated to a symposium for the Coastal Community Resilience to Climate Change and Diarrhoea (C2R-CD) Project. The session was chaired by Dr. Ted Annang; a member of the Work Package Two (2) sub-division of the project.

A welcome note was given by the chairperson of the occasion who led all participants to introduce themselves. Staff, students and senior research fellows of the Institute for Environment and Sanitation Studies (IESS) were in attendance. Also in attendance were special guests. They included assemblymen, municipal health directorate representatives, health officers and opinion leaders from the communities under study.

The seminar proceeded with the Chairperson and the Project's Principal Investigator, Dr. Dzidzo Yirenya Tawiah giving an overview of the project stating that it was aimed at generating data that will facilitate the understanding of the interactions between the climatic, hydrological, environmental, epidemiological, institutional, and socio-cultural determinants of health. Diarrhoea was stated as the case study and the communities to be studied were those found along the eastern and central coastlines of Ghana as they are known to be the most vulnerable to sea level rise and flooding incidents. To aid the realisation of the project's objectives, the project has been divided into five (5) work packages (WP1, WP2, WP3, WP4, WP5) which cater to the various components that will feed into the data for the project. The work packages were further described to involve a team of expert senior researchers, students and technicians working hand in hand with stakeholders and key informants from all the study communities.

Each work package was allowed to give a presentation on the work they have undertaken so far, data they have collected, and inferences made based on the data collected. Comments on the presentations were given by the symposium attendants and stakeholder representatives from the communities. Keynotes from the interactions based on the presentations included:

- Diarrhoea cases as seen in all communities were reduced.
- Even though there is some improvement in Water, Sanitation, and Hygiene (WASH) facilities within the communities, diarrhoea risk persists.
- Still, four (4) out of every ten (10) children have a high chance of having diarrhoea.
- There is still the need to devise strategies for risk reduction and adaptation for diarrhoea and climate-related diseases in these vulnerable communities.
- There were no significant differences between the cases in the rural and urban communities being studied.
- It is not enough to have improved Water, Sanitation and Health (WASH) facilities. There should be education on the use, sustainability and functionality of these facilities.
- Information from the research conducted must be communicated to the relevant stakeholder representatives within the communities to enable application within the communities.
- It is important that this project does not end up like every other project that sparks interest in the residents, employs the time of stakeholders and stakeholder representatives and in the end, produces no transformational outcome.

A documentary on the progress of the project was displayed and this sparked an appreciation for the achievement of the project.

Closing remarks were given, the participants were thanked and a prayer was also said by the principal investigator of the project and this ended the session. Figures 5a to 5f show pictures of activities that occurred in Hall C.





**Figures 5a – 5f: Activities in Hall C**

### **3.0 Summary of Day Two of Environment, Climate Change and Health Conference (13<sup>th</sup> October, 2022).**

The second day of the Environment, Climate Change and Health (ENCLIMAH) Conference was held entirely via zoom. The conference began at 9:10 am after arrival of the participants online. Dr. Daniel Nukpezah; a senior research fellow of the Institute for Environment and Sanitation Studies (IESS) gave a recap of the proceedings of the first day of the conference. He also gave an overview of the layout of the second day of the conference and introduced the guest speaker for Day Two – Prof. Esayas Alemayehu from the Jimma Institute of Technology, Ethiopia. Prof. Alemayehu delivered a keynote address on ‘Removal of Potentially Hazardous Pollutants from Water using Adsorptive Constructed Wetland Technologies’. In his address, he highlighted on the fact that in comparison with other types of water sources, fresh water is limited in quantity and hence, there is the need to sustainably utilise it and properly manage the waste water that is generated after its usage. He added that the large amount of waste water generated globally can be a resource if it is treated with appropriate technologies. He mentioned that some countries such as Israel are already using over 85% of their treated waste water for irrigation of farmlands. He also said that there are possibilities of utilising treated waste water for electricity generation. Prof. Alemayehu however stated that, the conventional water treatment systems in most African

countries are not sustainable enough and this is leading to Africa not being able to adequately exploit the opportunities of re-using treated waste water for new purposes. The technologies for treating waste water containing potentially hazardous pollutants which he shed light on included the use of volcanic rock material to remove fluoride from water and the use of termite mound to remove arsenate from water. He also stated that, to achieve sustainability of water resources, the 3Rs of waste management: Reduce, Reuse and Recycle must be applied to the management of waste water.

After the keynote address, parallel zoom sessions (breakout sessions) were held for the oral presentations of Day Two (2). Room One (1) of the breakout sessions was chaired by Dr. Opoku-Pabi and Dr. Daniel Nukpezah. Mr. Yaw Owiredu Mante was the first presenter in Room One (1). His presentation was on ‘Solid Waste Collection and Disposal Methods: The Case of a Sub-Urban Community in Koforidua, Ghana’. He stated that solid waste collection was a major problem in Ghana. With regards to Koforidua-Asokore, Mr. Mante mentioned that some of the challenges faced by residents included the high cost associated with solid waste collection, delay in collection of solid waste and the inadequate availability of waste bins. He recommended that there should be government support for solid waste collection and more effective solid waste collection methods should be explored. The oral presentations in Room One (1) of the parallel sessions were conducted not only by Ghanaians but also by some foreign nationals particularly from South Africa. Other notable presentations which took place in Room One (1) were: the presentation by Dr. Dzidzo Yirenya Tawiah on ‘Cleaning from the Bottom-Up: Integrated Stakeholder Engagement Project for Sustainable Waste Management’ and the presentation by Manuel Krauss pertaining to the implementation of RAIN Project in Ghana. There was a total of seven (7) presentations in Room One (1) of the parallel sessions. Questions and answers (Q/A) sessions were held at the end of the first three (3) presentations and also at the end of the remaining four (4) presentations.

A brief break was given after the parallel sessions ended and at 1:30 pm, poster presentations began. There was a total of seven (7) poster presentations and each presenter was allocated five (5) minutes. The poster presentation session was chaired by Dr. Benjamin Ofori. Some of the remarkable poster presentations include the presentations by Ms. Stephanie Owusua Adjei-Anim on ‘Assessment of Waste Purification Potential of Activated Carbon from Coconut Waste for Domestic and Commercial Use’, Ms. Sarah Addae on ‘Analysing the Perception of Consumers on



Recyclable Plastic Products: The Case of Furniture from Waste Tyres’, Mr. Prosper Adiku on ‘Spatio-Temporal Evolution of Diarrhoea in Coastal Ghana: Understanding the Evidence for Action’ and Adisatu Iddrisu on ‘Exploring Reservoirs – A Water Resource Assessment for the Sakumono and Nabogo Basins’. Each poster presentation session was followed by a question and answer (Q/A) session. After the poster presentations, a plenary session took place. Afterwards, an evaluation of the conference was carried out. During the evaluation, participants were allowed to give comments on how well the conference was conducted. Subsequently, the Director of the Institute for Environment and Sanitation Studies (IESS), Prof. Kwasi Appeaning Addo gave a concluding statement for the conference. In his concluding statement, he commented on how well the conference was carried out and expressed appreciation to all participants. This was followed by a vote of thanks given by Ms. Nancy Abrahams, a graduate student of the institute. She thanked all participants and sponsors for their contribution to making the conference a success. The conference was then called to a close at 3:30 pm.