

# Girls In Engineering, Mathematics And Sciences Competition Abia State Report



*Facilitated by*  
**OCEAN ACIDIFICATION**  
*with support from*  
**NIGER DELTA DEVELOPMENT COMMISSION (NDDC)**

## **BACKGROUND**

Nigeria, like the rest of African countries is a developing country that are particularly vulnerable to climate change, due mainly to its high dependency on natural resources and rain-fed agriculture as well as to its relatively limited technological and economic capacities. Ironically, several factors have placed Nigeria in a position of a contributor to global emission of CO<sub>2</sub>. For example, Nigeria as an oil producing country flares about 1.2 billion cubic feet (bcf/d) of gas a day. This amount of gas flare represents 12.5% of all globally flared gas, which is 68% of the associated gas produced or 51% of the total gas production. According to the African Energy Outlook for 2014, as at 2012, Nigeria flared about 17bcm on the average, slightly more than its annual consumption. However, gas flaring in other West African producing countries has remained around 12bcm per year.

Nigeria's per capita CO<sub>2</sub> Emission is estimated to be about 0.14 Metric tons by 2010. While developed countries like China and US are seen as industrialized nation with highest global emission, Nigeria doubles as a voracious consumer country that contributes to global emission from gas flaring, numerous automobiles, private jets ownership, manufacturing and agro allied industries. Nigeria's population of about 170 million puts her in a position that her carbon foot print is significantly huge when compared to industrialized less dense populated countries in Europe. Therefore, it will be difficult to exonerate Nigeria from global CO<sub>2</sub> emission due to her huge sources of carbon foot print.

From experiences, it is indicative that the proactiveness needed to fight climate change is not there. While the bulk of the rural settlements in Nigeria who make up the agrarian population are more vulnerable but lack basic information about Climate change, the urban settlement are not free from temperature variations that affect their socio-economic activities. Also, women's traditional roles, including subsistence farming and water collection which means they are most dependent on livelihoods and resources that are put most at risk by climate change.

However, Nigeria's situation in the face of changing climate is precarious. The threat of climate change to the socio-economic activities in Nigeria is grave and must be intervened upon with immediate effect. For example, the effect of Climate change to Agriculture which is considered as the most weather-dependent of all human activities since climate is the primary determinant for agricultural productivity. Nigeria is under obligation to use the maximum of available resources for the progressive commitment of CO<sub>2</sub> reduction. This obligation is encapsulated in national and international standards.

Secondly, most of us now realize we are addicted to fossil fuels that create vast quantities of carbon dioxide and that this addiction also extends to a wide variety of industrial and agricultural practices that create a whole host of other global warming gases.

The United Nation Framework Convention on Climate Change (UNFCCC) set October 1, 2015 as the deadline for 195 member countries to make pledges to commit to setting out their roadmap to limit the effects of global warming to less than 2°C by 2100. The convention has published 146 countries that have committed to reducing their greenhouse gas emissions. Regrettably,

Nigeria is missing from the list. This clearly shows the less commitments Nigeria is willing to sacrifice towards solving the climate crises.

The threat of climate change has never been more urgent. But the way forward has never been clearer. With citizens worldwide united in demanding action and clean energy solutions in our hands, a safe and sustainable future for the planet is finally in sight and the first step is a global agreement to reduce greenhouse gas emissions in Paris.

It is evident that awareness to adaptation is pivotal in the fight against Climate change and this is not at par with the rising consequences which the citizens and the policy makers would not undermine. This Justification give Rise to the Organizing of the Competition **to identify science innovation that will contribute to addressing the challenges of Climate Change and education Gap among Girls in Science and Engineering in the Secondary School s in Abia State.**

## **OBJECTIVES OF THE COMPETITION**

The Competition is organized by Akwa Ibom Peace House Initiatives with Support from Niger Delta Development Commission (NDDC)

The objective of this competition is to encourage more girls to participate in Engineering, Mathematics and Science (STEM) so as to break the stereotype of male domination of the sector which also has a contributive role on the gender/ salary gap

The competition is also meant to educate Girl Child on environmental issues directed at forming their minds for a future in the Niger Delta region and build resilience on Climate Change Mitigation and Adaptation.

The Competition is meant to identify science innovation that will contribute to addressing the challenges of Climate Change. Such innovative ideas in Engineering, Mathematics and Sciences should be specific in addressing issues/problem as it relates to global warming, greenhouse Gases, Fossil Fuel, sea level Rise, Ocean Acidification etc

### **1<sup>st</sup> Phase- Pre Competition:**

First Phase was made up of the mobilization of the schools for the competition. The state was sectioned into three, representing each of the senatorial districts of Abia State. The Ministry of Education was informally engaged to obtained list of girls science schools in each of the senatorial districts. The schools were contacted to indicate their interest in participating.

The following are schools contacted

- .Adventist Secondary Technical College Owerrinta (ASTECC), Abia State

1. Ibeku High School, Umuahia, Abia State
2. Ultimate Heroes International Secondary School, Aba, Abia State
3. Shekinah Secondary Schools, Aba, Abia State
4. Gift International Model Schools, Aba, Abia State
5. Dean of Wisdom International School, Owaza, Ukwa west L.G.A, Abia State
6. Owaza Secondary School, Owaza, Ukwa West L.G.A , Abia State
7. The Apostolic Secondary School, Owaza, Ukwa west L.G.A of Abia State
8. Divine International School, World Bank Estate, Aba, Abia State.
9. Girls Secondary School Abayi Osiosoma Ngwa LGA
10. St Joseph college. Aba. Abia State.
11. Senior Science Secondary School Alayi Bende LGA. Abia state
12. Egwuena Girls, Secondary School, Abiriba Abia
13. Intellectual Giant Academy. Aba.

Out of the 13 schools contacted , 5 declined participation and have to be dropped at this point. while 9 moved to the second phase of the project.

The nine that move to the second stage were as follows:

1. Ibeku High School, Umuahia, Abia State
2. Ultimate Heroes International Secondary School, Aba, Abia State
3. Shekinah Secondary Schools, Aba, Abia State
4. Gift International Model Schools, Aba, Abia State
5. Dean of Wisdom International School, Owaza, Ukwa west L.G.A, Abia State
6. Owaza Secondary School, Owaza, Ukwa West L.G.A , Abia State
7. The Apostolic Secondary School, Owaza, Ukwa west L.G.A of Abia State
8. Divine International School, World Bank Estate, Aba, Abia State.
9. Girls Secondary School Abayi Osiosoma Ngwa LGA

Pictures of the Advocacy Visit to Ultimate Heroes intl secondary School, Aba, Ahead of the GEMS competition in Aba, Abia State and Pictures of the Students who came second at the Competition

## 2<sup>nd</sup> Phase

Those indicated interests were visited to ascertain their claims and authenticate their interest.

The nine schools used that opportunity to present their concept to the facilitating NGO. Guidelines were also discussed with each of the participating schools.

At the Visit to Adventist Secondary Technical College Owerrinta (ASTECC) The Mobilization Team inspected the Laboratory and was briefed on the preparation of the School to participate in the competition, The Team was welcomed by the Assistant Principal of the School and Promised to Ensure their School participate Actively at the Competition.

Pictures of the Advocacy/Mobilization Visit to Adventist Secondary Technical College,Owerrinta

Pictures of the Discussion with the Principal of Adventist Secondary Technical College Owerrinta.

Pictures of the Students exhibiting the invention in the School Laboratory at Adventist Technical College  
Owerrinta

Pictures of the Visit to the Adventist Technical College ,Owerrnta Ahead of the GEMS Competition

Out of the nine schools that indicated interest, 4 qualified for the competition while the remaining dropped to observing status . The Participating School are;

- .Adventist Secondary Technical College Owerrinta (ASTECC), Abia State
- Ibeku High School, Umuahia,Abia State
- Ultimate Heroes International Secondary School,Aba,Abia State
- Shekinah Secondary Schools,Aba,Abia State
- Gift International Model Schools,Aba,Abia State
- Dean of Wisdom International School,Owaza,Ukwa west L.G.A, Abia State
- Owaza Secondary School,Owaza,Ukwa West L.G.A ,Abia State
- The Apostolic Secondary School,Owaza,Ukwa west L.G.A of Abia State
- Divine International School,World Bank Estate,Aba,Abia State.

#### **THE COMPETING SCHOOLS;**

- Adventist Secondary Technical College Owerrinta (ASTECC), Abia State
- Ibeku High School, Umuahia,Abia State
- Ultimate Heroes International Secondary School,Aba,Abia State



- Shekinah Secondary Schools, Aba, Abia State
- Gift International Model Schools, Aba, Abia State
- Divine International School, World Bank Estate, Aba, Abia State

### **3<sup>rd</sup> Phase**

#### **COMPETITION**

Girls in Engineering, Mathematics and Science (GEMS) Competitions took place at No. 139 Azikiwe Road Arondizuogu Patriot Hall in Aba Abia State.

The Event started with the Arrival of the organizers of the Competition Akwa Ibom Peace House Initiative Represented by`

Comrade Nelson Nnanna Nwafor The Programme Facilitator for the Competition in the State, The Participating schools and The Panel of Judges in Persons of ■ Mrs Madam Enuice Egbuna, ■ Mr, Uchenna O. Kalu and Engr. Williams Oju James

Registration of Schools started at 10:18am and ended 12:00pm.

The event kicked off with opening prayers by Mr. Samuel from Ibeku High School, introduction of the School followed by an opening remark by Comrade Nelson Nnanna Nwafor the programme Facilitator for Abia State.

A special guest of honour gave an introductory speech on 'GEMS' saying that these subjects and courses studied in Schools and Universities are not limited to only male gender but female as well. She stress that the objective of the competition is to encourage more girls to participate in Engineering, Mathematics and Science (STEM) so as to break the stereotype of male domination of the sector which also has a contributive role on the gender salary gap. She encouraged the students to study, discover and put their ideas into realizable goals.

Comrade Nelson Nwafor The Programme Facilitator braced up the event by expounding on climatic change and the Impact on the Environment in which he explore various areas of climate change on the Environment due

to Emission and Human Factor and stress the need for the Students to be informed on the Happenings on their Environment occasioned by Climate Change. This teaching was interactive in nature and students participated actively during this session.

Next on the programme was scientific exhibition by competing Schools. However, Criteria for the competition was stated out for clear scoring of school based on the project/Exhibition each School will showcase in line with the focus of the competition ***Climate Change-Global Warning, Greenhouse Gases, Fossil Fuels, Sea Level Rise, Ocean Acidification***

#### **CRITERIAS FOR THE JUDGING (100 Point)**

- **Research /Description (10 points)**
- **Design/Methodology (15 points)**
- **Execution ie Construction and Testing (20 points)**
- **Creativity (20 points)**
- **Presentation/Interview (35 points)**

The Ibeku High School was first to present their project 'Fahrenheit Generator.' Miss Agumoh with her team presented advantages of science. The team shed light on the benefits of Fahrenheit Generator which are environmentally friendly.

#### **CONCEPT**

- Material involved include
  - i) Accumulators ( Secondary cell)
  - ii) Two (2) D.C motor
  - iii) Led bulbs
  - iv) Switch
  - v) Two (2) pulley and

## vi) Conveyor belt

Considering the effect of green house gas such as the carbon (iv) oxide, sulphur (iv) oxide, Nitrogen environmental with a solution to eliminating these green house gases which are basically produced as a result of using the fossil fuel. These fossil fuel e. g petroleum when used in our cars and generators produce soot ( or smoke) which are mainly carbon (iv) oxide, sulphur (iv) oxide etc. These gases go to the atmosphere and trap the sun, causing an increase in temperature of the atmosphere which automatically leads to global warming which affects the lives of living organisms. The FENRAD generator was produced so as to eliminate the green house gases. It is environmental friendly as it can easily be used inside our rooms even when we are sleeping. It eliminates noise pollution as it is noiseless. It is produced with local materials. The pulley system conveying belt is just an ordinary rubber band.

When we switch on, the switch on body of the generator, the electrons from the dissociation of the cell will induce the commutators in the first D.C. motor through the conveyor belt and electrons are being transferred to the bulbs and the bulb lights.

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Adventist Secondary Technical was the second to present. Their presentation was on bio-digester using animal dung of 200grams among other components. They lacked concrete presentation with project but improvised using a drawn chart.

### **CONCEPT**

The concept is based on the principle of conservation of Energy whereby waste food are placed inside a biodigester with animal dung forming the base of the

digester. The waste food will decompose with the help of analyse enzyme under anaerobic conditions. During the decomposition process, three gases are produced viz hydrogen sulphide, carbon (iv) oxide and methane, which is the biogas used for cooking and other purposes.

The three gases produced leave the digester through a connecting hose to a chamber packed with activated charcoal which absorbs the hydrogen sulphide gas only. The remaining two gases move through a connecting hose to another chamber packed with sodium hydroxide solution which absorbs the carbon (iv) oxide which is a greenhouse gas.

Finally, the methane gas leaves this chamber through a connecting hose to the last chamber containing distilled water. This is so, because, methane gas is collected over water according to the Dalton's Law of Partial Pressure. The biogas (Methane) is then transferred to the gas cylinder.

A short interlude was observed to ease off. At the end, of it, Ultimate Heroes International school braced the floor for their presentation of "Generator" the team with their cello-tape, battery, carton, motor fan etc gave a life presentation/construction of the generator before all. It was quite inspiring.

Gift Int'l Model School came up with their project on Global Warming, flooding etc which endangers lives and properties. This presentation was done with a diagram.

### **CONCEPT**

The above school presented on the above topic. We discussed what happens when there is sea level rise. The people living along the coast witness a lot of flood. And this causes destruction of lives properties and farm products.

However, the school is of the opinion that government ought to create serious awareness to those building along the riverine areas. Government should build houses for those ones, to avoid the yearly loss cause by flood.

Moreover, the school also discussed the problem of bush burning during farming, how it causes ozone layer depletion.

And the solution lies in stopping of bush burning, encouragement of planting of trees from time to time.

Ultimate Heroes International Secondary School presented the concept below as the fourth competing school

### **CONCEPT**

Our exhibition is just to minimise the depletion of the ozone layer that is been caused by Co<sub>2</sub> carbon (iv) oxide and Co (carbon (i) oxide) bases on that we decided to avoid the used of petroleum to power the generator produced we to mainly battery. The component we used are as follows:

- a) Battery
- b) Aluminium as the conductor of the electricity
- c) Loo
- d) Fan motors that produces the sound when the generator is started.
- e) Switch – that helps to power the generator when put on or off.
- f) Two AC motor that serves as an opening when the plug are put

After the exhibition has come to an end, opportunity was given to spectators to enlighten others in which Shekinah Model Academy threw light on climatic change, ozone layer and discoveries of scientists years back.

Divine Int'l School contributed by speaking on global warming, climate changes and ozone layer.

At the close of the Exhibition and The judges carefully using the criteria set for the Scoring come with the Following Results

Gift International School took 4<sup>th</sup> with 40 points. The Adventist Technical School took 3<sup>rd</sup> position with 55 points. Ultimate Int'l Secondary School took the 2<sup>nd</sup> position with 70 points and Ibeku High School won the exhibition with 77 points taking the first position. Awards were presented to winners of the context and participating schools. Science Equipments was also presented to the 1st, 2nd and 3<sup>rd</sup> Position, Plaques and Certificate was also presented to all the participating School

Refreshment was served to participants and Other House Keeping Group pictures of participated schools were taken and other closing formalities

In the Closing Remark The Programme Faciliator Comrade Nelson Nnanna Nwafor thanked Akwa Ibom Peace House Initiative Represented ***For bringing the programme to Abia State and Commend them for the Awareness created to educate Girls Child to be committed to their Studies and Take the study of climate Change Seriously which is the Emerging issues in the international discourse and thank the Teachers of the participating School for making out time to attend the Competition and Promise to sustain the Relationship created with this school in informing and educating them on the issues surrounding climate change and charge them to include Climate change in the School curriculum***

The Programme ended at 4:12pm and closing prayer was said by one of the students of the participating School.