



**SCIENCE AND TECHNICAL TRAINING
FOR WATER QUALITY MONITORING
AND MANAGEMENT OF SUSTAINABLE
WATER RESOURCES**

UNIUYO-GIST LINKAGE PROGRAMME



FINAL REPORT

JULY, 2018

CAPACITY BUILDING ACTIVITY

SCIENCE AND TECHNICAL TRAINING FOR WATER QUALITY MONITORING AND MANAGEMENT OF SUSTAINABLE WATER RESOURCES

Background:

On May 6, 2013, a team of Professors from Gwangju Institute of Science and Technology (GIST), South Korea visited the University of Uyo facilitated by Dr. Edu Inam, who had previously spent three years as a post-doctoral fellow in GIST courtesy of Schlumberger Faculty for the Future Programme.



As part of the visit, an MOU was signed and exchanged between the two Institutions, signaling the beginning of the University of Uyo – GIST, Korea relationship. The MOU covered collaborations and partnership

in advanced research and training among other items. On the basis of this relationship, International Centre for Energy and Environmental Sustainability Research founded by Dr. Inam was assigned the responsibility of operating the UNIUYO – GIST LINKAGE PROGRAMME. The programmes had two components: research and training.

Title of Training: Science and Technical Training in Water Quality Monitoring and Management of Sustainable Water Resources

Duration: 10 days

Venue: Gwangju Institute of Science and Technology Korea

Objectives:

The objective of the training is basically to build indigenous capacity in advance techniques in water science and technology as well as promote exchange and transfer of knowledge between South Korea and Nigeria towards meeting the targets of the Millennium Development goals and vision 2020.

Permit me to underscore the importance of this training, 1 in 9 of 793 million people around the world lack access to clean water. Sub-Saharan Africa has the largest number of water stressed countries than any other place on the globe due to their inability to take water from the rivers and aquifers (World water development report 4, 2012). This challenge touches all aspects of development including health, agricultural productivity, education and opportunities of women and children, stability and peace as well as economic productivity. The [Human Development Report](#) goes on to explain that because of Africa's dependence on rain-fed agriculture, widespread poverty, and weak capacity, the water issues caused by climate change impact the continent much more violently compared to developed nations that have the resources and economic diversity to deal with such global changes. This heightened potential for drought and falling crop yields will most likely lead to increased poverty, lower incomes, less secure livelihoods, and an increased threat of chronic hunger for the poorest people in sub-Saharan Africa. Therefore, it is imperative for countries within Sub-Saharan Africa to build indigenous capacity in sustainable water resources management

Expected Outcomes:

1. Improve capacity building efforts in developing countries both in Sub-Saharan Africa and Southeast Asia such as Bangladesh, Cambodia, Myanmar, Democratic Republic of the Congo, Nigeria, Kenya, Sudan, and United Republic of Tanzania, by imparting technical and theoretical training in water quality testing methodologies for the management of sustainable water resources within these respective countries.
2. Contribute to the achievement of ensuring environmental sustainability by providing practical methods of monitoring the quality of water at the national level and improve the quality of life by providing information on drinking water safety in respective countries.

Implementing Partners:

- Gwangju Institute of Science and Technology, Korea (GIST)
- International Centre for Energy and Environmental Sustainability Research, University of Uyo, Nigeria

Budget over 3 years (Provided by Korea): 144,000USD

Number of beneficiaries: 25 (5 per batch)

Selection of Candidates: The call is made open to eligible candidates. Candidates go through competitive selection process both conducted by ICEESR and GIST. For the 1st batch preference was given to Akwa Ibom State. Subsequent batches will include other states of Nigeria and other least developed countries in Africa.

List of Experts

<i>Name of Expert</i>	<i>Institutions</i>
<i>Prof Heechul Choi</i>	Director of UNDP-Korea Project
<i>Prof Yunho Lee</i>	Head of Research and Education Division, GIST
<i>Dr Suil Kang</i>	Head of International Collaboration Division
<i>Dr Kenneth Widmer</i>	Research Professor
<i>Dr Youngmin Rho</i>	Research Professor
<i>Dr Jeongkon Kim</i>	Invited Lecturer-R and D Director-Korea Construction and Environment Technology
<i>Ms. Seo-Young Kang</i>	Researcher
<i>Ms. Eun-Kyoung Cho</i>	Researcher
<i>Mrs Hyeon Olivia Kim</i>	Researcher
<i>Ms. Seri Eom</i>	Administration staff

BENEFICIARIES

UNDP Training Participants



Aguh Nug
CAMEROON



Esther Etim
NIGERIA



Saviour Udo
NIGERIA



Idongesit Ambrose
NIGERIA



Joseph Essien
NIGERIA



Iforo Udo
NIGERIA



Leticia Aryeetey
GHANA



Lawrence T. Nanganoo
CAMEROON



Charles Boateng
GHANA



Benjamin Kamanga
MALAWI

UNDP Training Participants



Idiat Sanda
NIGERIA



Wilford Jwalshik
NIGERIA



Kate Akpabio
NIGERIA



Christiana Udosen
NIGERIA



Colbert Mukete
CAMEROON



Charlotte Adjei
GHANA



Emmy Lema
TANZANIA



Jacob Mabula
TANZANIA



Nyirabu MUSIRA
TANZANIA



Abdelazim Ahmed
SUDAN

UNDP Training Participants



Charles Lange
KENYA



Mtisunge Mngoli
MALAWI



Andrew CHINYEPE
ZIMBABWE



Frehiwot Abeje
ETHIOPIA



Samson Gabre
ETHIOPIA

Beneficiaries of UNIUYO-GIST Korea UNDP Training

Participants from Nigeria and other African Countries

S/N	NAME	NATIONALITY	AFFILIATION
1	Joseph Peter ESSIEN	Nigeria	Department of Microbiology, University of Uyo, Uyo, Nigeria
2	Esther Unyime ETIM	Nigeria	Department of Chemistry, University of Uyo, Uyo, Nigeria
3	Itoero Esiet UDO	Nigeria	Department of Chemistry, University of Uyo, Uyo, Nigeria
4	Christiana Ime UDOSEN	Nigeria	Department of Microbiology, University of Uyo, Uyo, Nigeria
5	Saviour Peter Udo	Nigeria	Akwa Ibom State Rural Water Supply and Sanitation Agency, Nigeria
6	Idongesit Sunday Ambrose	Nigeria	Ministry of Environment & Mineral Resources, Uyo, Nigeria
7	Kate Otobong Akpabio	Nigeria	Akwa Ibom Water Company Limited, Uyo, Nigeria
8	Sanda Idiat Modupe	Nigeria	Federal Ministry of Environment, Abuja, Nigeria
9	Lawrence Tatanah Nanganoa	Cameroon	Institute of Agricultural Research for Development (IRAD)/Ministry of Scientific Research and Innovation, Cameroon
10	Colbert Manene Mukete	Cameroon	Cameroon Development Corporation, Cameroon
11	Aguh Akeh Nug	Cameroon	The Environmental and Rural Development Foundation, Cameroon
12	Wilford Zungkat Jwalshik	Nigeria	FCT Water Board, Abuja, Nigeria
13	Charlotte Akwaah Adjei	Ghana	TEMA Metropolitan Assembly, Ghana
14	Leticia Aryeetey	Ghana	Tema Oil Refinery, Ghana
15	Charles Mario Boateng	Ghana	University of Ghana
16	Benjamin Kamanga	Malawi	Malawi Government, Ministry of Environment and Climate Change Management, Environmental Affairs Department, Malawi
17	Abdelazim Mohammed Ahmed	Sudan	National Center for Research - Environment and Natural Resources Research Institute, SUDAN
18	Emmy Solomon Lema	Tanzania	DEPT. OF PHYSICAL SCIENCES, SOKOINE UNIVERSITY OF AGRICULTURE, TANZANIA
19	Jacob KIHILA MABULA	Tanzania	Ardhi University, TANZANIA
20	Nyirabu ZABLON MUSIRA	Tanzania	Energy and Water Utilities Regulatory Authority (EWURA), TANZANIA
21	Charles Nzavi Lange	Kenya	National Museums of Kenya
22	Mtisunge Mngoli	Malawi	Lilongwe University of Agriculture and Natural Resources, Malawi
23	Frehiwot Bayou Abeje	Ethiopia	Addis Ababa Water and Sewage Authority, Ethiopia
24	Samson Girma Gabre	Ethiopia	Ethiopian Public Health Institute, National Drinking Water Microbiology Laboratory, Ethiopia
25	Andrew CHINYEPE	Zimbabwe	Scientific and Industrial Research and Development Centre (SIRDC), ZIMBABWE

FEEDBACK FROM PARTICIPANTS

Leticia Aryeetey, Ghana 

“The two weeks training in water quality monitoring and sustainability management at GIST was generally one of my best experiences. The training afforded me the opportunity to be introduced to critical methods in water quality management. I had hands experience in the preparation of samples and standards for analysis. I had the opportunity of working with Inductively Coupled Plasma –Optical Emission Spectroscopy, Gas Chromatography-Mass Spectroscopy and the Atomic Absorption Spectroscopy. I had the opportunity of learning entirely new things especially in the microbiology lab. Here we were introduced to the theory as well as practical enrichment and enumeration methods for determining pathogenic organisms in water. We were also introduced to new methods in air quality monitoring. The approach was a combination of both theory and practical and this led to a deep sense of



appreciation on my part. The industrial visit to the drinking and wastewater treatment plants was so revealing as I learnt new techniques employed by developed countries in treating waste water. The organizers of the programme did an excellent job. We were warmly received and well catered for. I experienced the rich culture of the people of Korea. I felt welcomed everywhere I went. I was treated to some good Korean dishes. I also had the opportunity to meet people from different African Countries with whom I shared ideas on issues pertaining in our respective countries and the continent as a whole. left GIST empowered with knowledge I could

transfer to my working colleagues. I also established relationship with other nationals I could share ideas with on the issues of water quality. I would also want to thank the programme organisers as well as their partners for the opportunity to be part of this all important training.

Benjamin Kamanga. Malawi 🇲🇼

“I was happy to attend a Korea-United Nations Development Programme (UNDP) regional training workshop which took place in Gwangju Institute of Science and Technology (GIST), from 24th August-4th September, 2015 in South Korea. I was very privileged to learn a lot from experts from GIST, K-Waters, Waste water treatment plant, drinking water treatment plant and officials from the various ministries and research institutes from Korea.



Figure 1; Chemistry Laboratory



Figure 2: Enjoying Korean food with Dr kang and all members

I learnt a lot on issues including critical techniques in determining water quality and contamination of water resources, through hands on training. The course provided me with basic techniques in determining microbiological, inorganic and organic contaminants using advanced techniques and instruments (ICP/MS and LC/MS/MS) along with measuring water parameters. I also learnt various advanced molecular techniques for detecting waterborne pathogens.

We were also able to visit waste water treatment plant and drinking water treatment plant as shown in the following photos;



Socially, I enjoyed staying in Korea, especially in Gwangju, where I enjoyed eating Korean food and we were able to move around freely and very comfortable. This has been my best workshop ever on which, personally I would be happy to visit Gwangju again. I also liked the warm welcome by the organisers of the training who were supportive during the entire training period.

Lessons learnt from the training are; there is a need to encourage collaboration among African countries and other research institutions in order to improve the water quality for the betterment of a-biotic and biotic features. It was also noted that countries should take responsibility in increasing funding for research. I was happy to hear that the



GIST through various programmes is very willing to collaborate with African institutions and other international institutions in order to improve research in Water quality management.

Sanda Idiat Modupe, Nigeria 🇳🇮



It was gratifying experience because I had the opportunity to gain familiarity with water quality analysis methods, lay hands on practical techniques and understand concepts of microbial water quality techniques. I had an opportunity to meet with colleagues from other African countries and workshop personnel to discuss the challenges facing developing countries as regards to urban water supplies which will be in-cooperated into the final document stating the outcomes of the workshop. I was exposed to practical in the chemistry laboratory; use of instruments and organic analysis. I was taught how to analyze water samples microbiologically with new techniques such as the use of DNA Extraction - FTA Elute Cards, Molecular Methods- Polymerase Chain Reaction, Casting and Running Electrophoresis Gels. I was lectured on the Remote

Measurement of Atmospheric aerosol by LIDAR, Basic principles & construction of waste water treatment plants, Water Quality Standards in Korea, Environmental Impact Assessment and River Basin Managements. I was given an opportunity to visit the Yung Sung River Environmental Research center, Deoknam Water Purification Plant, Gwangju Waste Water Treatment Plant which has a capacity of about 60,000 tons per day and the Health and Environmental Research Institution of Gwangju.



I want to appreciate the Director and staff of IERC, ICEESR/UNIUYO for giving me an opportunity to participate in the 4th IERC workshop on

Science and Technical Training for Water Quality Monitoring and Management of Sustainable Water Resources

Lawrence Tatanah Nanganoa, Cameroun 



Our capacities were improved through impartation of theoretical and technical training in water quality testing methodologies for the management of sustainable water resources. Practical methods of water quality monitoring were learned. This was geared towards the improvement of quality of life by providing information on drinking water safety and environmental sustainability in our respective countries. Through this transfer of technical skills and theoretical knowledge; I have had a deeper understanding and skills in water quality monitoring and management of sustainable water resources. I was exposed to state-of-the-art equipment used in the analysis

of Inorganic contaminants (ICP – OES, ICP – MS) and organic contaminants (GC – MS, LC – MS and HPLC). I also had a hands-on training in basic Microbiology techniques to evaluate water quality along with experience with basic molecular techniques. After familiarization with these microbiological techniques, I have gained confidence in conducting similar protocols in my laboratory. I also had lectures on Air pollution, remote measurement of Atmospheric Aerosol by LIDAR, wastewater treatment, River basin management, Environmental Impact Assessment and water quality management policy in Korea. We also visited the drinking and wastewater treatment plants where I was exposed to the know-how of Korean Institutions.

APPENDIX

CALL FOR NOMINATION/APPLICATION FOR A UNIUYO - GIST KOREA UNDP TRAINING PROGRAMME

International Centre for Energy and Environmental Sustainability Research is seeking nominations/ applications from suitable candidates for a 10-day intensive training programme in Korea on **WATER QUALITY MONITORING AND MANAGEMENT OF SUSTAINABLE WATER RESOURCES**.

BACKGROUND OF THE PROJECT

The University of Uyo, Uyo in partnership with Gwangju Institute of Science (GIST), South Korea has received funding from **UNITED NATION DEVELOPMENT PROGRAMME KOREA** to undertake **TECHNICAL TRAINING IN WATER QUALITY MONITORING AND MANAGEMENT OF SUSTAINABLE WATER RESOURCES**. The International Centre for Energy and Environmental Sustainability Research on behalf of the University of Uyo is coordinating the programme for Nigeria as well as African Region. The training will focus more on hands on activities and is designed to impart techniques and knowledge in basic and advanced methodologies for evaluating water quality.

The programme is fully sponsored by KOREA –UNDP. Intending nominees / applicants must meet the following requirements:

1. University degree in basic science
2. Proficiency in laboratory skills or familiarity (basic chemistry and microbiology)
3. Proficiency in English
4. Must be employed by Public / Private sector involved in Water Resources Management
5. The employer must give a letter of guarantee

Therefore, interested nominees/applicants should submit the following documents:

- a. application or nomination letter
- b. CV not more than five pages (Please attach passport photo on white background)
- c. one-page professional statement on how the training will add value to career or current work

All applications should be addressed to:

**THE CHAIRPERSON ICEESR,
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF UYO, UYO
P.M.B. 1017
UYO**

CLOSING DATE:

The closing date for the receipt of the applications is June 30, 2013. Shortlisted candidates will be contacted.

Thank you.

Gertrude Archibong

Secretary (ICEESR).

APPLICATION FORM

UNDP Training Program, “Water Quality Monitoring and Management of Sustainable Water Resources” hosted by UNU-GIST Joint Programme on Science and Technology for Sustainability

Applicant Name: (as appears on passport)

Only one applicant per form

First _____ **Middle** _____ **Last** _____

(use capital letters for last name)

Gender _____

Date of Birth _____

(Year / Month / Date)

Nationality _____

Current Status: Bachelor Degree ()

MSc. Student ()

MSc. Degree ()

Ph.D. Student ()

Ph. D Degree ()

Current Affiliation:

Mailing address:

Phone No:

Include country and area code

E-mail:

Fax No:

Include country and area code

Required documents for application

E-mail: Application form

Curriculum Vitae (word file)

Cover Letter (word file)

Letter of recommendation