KNUST RWESCK
Regional Water & Environmental Sanitation Centre Kumasi

Kwame Nkrumah University of Science and Technology

Newsletter

FEBRUARY 2023

FEATURING

ACTIVITIES

ANNOUNCEMENT

@rwesckknust

Featuring

Combating Water Theft and Improving Water Quality: Latest Developments and Initiatives

The Regional Water and Environmental Sanitation Centre Kumasi (RWESCK-KNUST) is collaborating with the Community Water and Sanitation Agency (CWSA) to curb the challenge of water theft and poor water quality for improved utility management.

Discussions are already underway to roll out the ambitious project. The KNUST team was led by Prof. Sampson Oduro-Kwarteng, the Director of RWESCK. It comprised of five senior lecturers and three Ph.D. students from the Chemical and Mechanical Engineering Departments, as well as the Computer Science Department. They engaged the CWSA Board at a round table on Tuesday, December 6th, 2022. The team cogently presented the proposed technical solutions viz., A Water Treatment Plant Design, A Robotic Water Loss and Theft Tracking Technology, as well as Billing and Payment Software.

In the meeting, the Chief Executive Officer of CWSA, Ing. Dr. Worlanyo Kwadjo Siabi iterated that *"almost 50% of the water production is lost in water management"*, and despite the efforts being made to end it, there has not been much progress.

The Water Treatment Plant team highlighted the issue of contaminated water in Ghana. UNICEF reported that about 76% of households are at risk of drinking water containing faecal matter. To combat this, the team will design a water treatment plant using local materials and expertise. The treatment plant will include a pump house, a filtration and absorption process, an overhead tank for distribution, and a solar heating tank for effective desorption. The use of clay materials to produce filters will also be employed for enhanced contaminants removal. Flow meters will be used to monitor the amount of water entering the system.

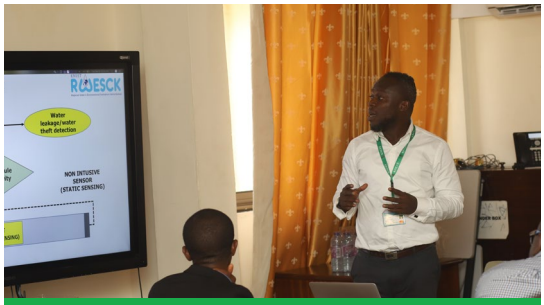
Round-table Meeting

The Water Robotics Project team proposed an artificial intelligence-aided water loss tracking system for water theft and leakage detection. The system will incorporate a physical robot equipped with an underwater camera that can move in any direction within pipes to detect cracks, bursts, and leaks. The robot will transmit data via Wi-Fi and SD card to a server, which will use a machine learning algorithm to process and analyse the data received. Additionally, the system functionalities will be improved by GPS and cloud-based technology.

The last team presented a new **Billing and Payment Software** designed to manage utility data efficiently at community, regional, and national levels. This team aims to develop a web based mobile application for water asset management as well as billing and payment software. The system works at three different levels and can identify customer problems and save money.

The project's objective is to prevent water theft for improved and sustainable water distribution. With the development team hoping to proceed to prototype testing, Dr. Worlanyo Siabi, the director of CWSA, is optimistic about the technology's future. Professor Sampson Oduro-Kwarteng, the director of RWESCK, is grateful for the collaboration and hopes for further development of digital systems to address Ghana's water management challenges.

Water Treatment Plant Project Lead



Water Robotics Project Ph.D. Student.

Featuring

RWESCK-KNUST Scientists Use Faecal Activated Charcoal for Wastewater Purification

The Regional Water and Environmental Sanitation Centre Kumasi (RWESCK-KNUST) scientists have developed a method using faecal activated charcoal to purify wastewater. The process involves taking dewatered faecal sludge and drying it on a sand bed before using it to create the charcoal. This has been found to be a much cheaper and more effective method to purify wastewater. The obtained water can be used for irrigation, washing, and flushing after disinfection, with the added advantage of it being easily available from wastewater treatment facilities.

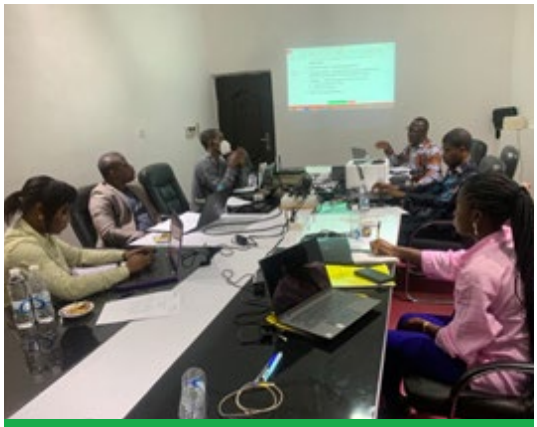
According to the published scientific article in *Advances in Materials Science and Engineering* at https://doi.org/10.1155/2023/4883492, the study evaluated the effectiveness of faecal sludge-derived activated charcoal in removing wastewater pollutants. The results have indicated high removal efficiency of pollutants, leading to a decrease in muddiness, smell, and colour, among other factors.

Effluent from Mudor WWTP

DFSAC Filtration Setup

Activities

ISO Documentation for RWESCK Laboratory Commercialisation



Laboratory Committee

Laboratory Committee

The development and use of ISO/IEC 17025:2017 is one of the many reforms that RWESCK has undertaken. The Laboratory Committee started a three-day retreat to analyse the ISO documentation, which took place at the Bedtime Hotel in Koforidua. The goal was to talk about the different processes and implementation issues that might need more explanation to ensure a successful deployment.

The retreat's objectives were to complete all forms and procedures, decide when GSA will conduct a document review, and guarantee accurate and trustworthy outcomes.

Throughout the retreat, participants gained a better understanding of the need for the implementation of the ISO/IEC 17025:2017. The requirement of management and personnel were understood properly.

Activities

RWESCK Welcomes Freshmen

In January 2023, RWESCK opened its doors to freshmen. With students from various African countries, the batch is shaping up to be one of RWESCK's most intriguing with varying backgrounds.

The orientation ceremony to officially welcome students took place at the Centre's Auditorium. Faculty staff present were the Centre Director, Professor Sampson Oduro-Kwarteng, Centre Academic Coordinator, Professor Kwaku Amaning Adjei, also Professor Emmanuel Amponsah Donkor, Professor (Mrs.) Esi Awuah, Professor (Mrs.) Helen Essandoh, and Dr. (Mrs.) Miriam Appiah-Brempong.

As part of the welcome address, Prof. Adjei, the academic coordinator introduced new students to the vision and research thematic areas of the centre, highlighting graduation and academic work requirements. The Director, Prof. Oduro-Kwarteng further urged new Students to join hands in moulding RWESCK into a robust research institution. The orientation concluded with an interaction session where freshmen were allowed to seek clarifications as well as express potential concerns, being enthusiastic about their new venture.

RWESCK Senior Staff

Activities

A National Workshop on Digital Transformation Skills Development in the Water and Sanitation Sector in Ghana

On 25th - 26th January 2023, RWESCK in collaboration with AgroParisTech organized a National Workshop on Digital transformation skills development in the water and sanitation sector in Ghana, Accra. Speaking at the national workshop, the Centre Director, Professor Sampson Oduro-Kwarteng, emphasized that the goal of the project is to support capacity building for smart water and sanitation solutions and innovative technologies to manage water utility and waste resource recovery in Ghana, thus increasing youth employability.

Funded by the French Embassy in Ghana, the NYANSAPO Project aims to bridge the gap in digital skills related to the application of digitalization innovations and smart circular economy in water and sanitation utility management in Ghana.

The workshop had 33 participants from organisations in the Water and Sanitation Sector. So far, evaluation responses received via google forms indicate that 44% of the participants are enthused about the project objectives and poised to develop digital skills.
https://www.myjoyonline.com/digitalisation-of-water-and-sanitation-sector-wont-make-people-jobless-director-rwesck-knust/

French Embassy Representative

*French Partners, **AgroParisTech***

Announcements

Call for Application as Interns

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