'Reach and Teach Science in Africa': Strengthening Agricultural Research Capacity to Tackle Food Insecurity in Africa

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A Report Prepared by Carol N. Ibe

In April 2019, early-career researchers from the Department of Plant Sciences, University of Cambridge, organised a large-scale scientific training workshop in collaboration with the Laboratory of Genetics, Horticulture and Seed Science (GBioS) at the University of Abomey-Calavi in Benin Republic. The workshop involved 100 agricultural researchers from 19 African countries and was taught by 10 researchers from the University of Cambridge, University of Nottingham, the Pontificia Universidad Católica in Chile, and Texas A&M University, USA. The project was developed by Carol Ibe, a PhD student/Gates scholar at the University of Cambridge and Founder of JR Biotek Foundation.

When Carol Ibe moved from Nigeria to the United States for her biology masters, she encountered a completely different academic environment from her undergraduate degree that facilitated a change in her career trajectory. In addition to greater access to lab infrastructure and relevant and up-to-date reading materials and textbooks, there was a focus on driving young scientists to ask key questions to shape their own research. This experience stayed with Carol and added to the changes she sought to develop in emerging African bioscience. One such example is the Molecular Biology Training & Open Labware Building Workshop, which is part of the 'Reach & Teach Science in Africa' capacity building project developed to reach, teach and provide relevant academic resources to 1,000 Africa-based agricultural researchers by 2029. It was designed to provide core bio-scientific knowledge and laboratory skills to Africa-based agricultural researchers who would lead their own future research agenda.

The workshop provided 100 early-career agricultural researchers the opportunity to gain new knowledge and scientific skills, as well as to form a strong research network across the continent and internationally. The training was delivered through a three pillared approach of bioscience theory, DIY lab infrastructure and the 'Bio-innovation for Africa' pitching challenge. Each part was designed to complement the other pillars and tailored to the requested needs from previous exchanges with past participants.

Lectures on core molecular biology principles and laboratory skills, crop breeding, plant physiology, and statistical analysis were taught by the 'Reach & Teach' team. Catherine Danmaigona Clement, a PhD student at Texas A&M University, taught the course on statistics. Catherine was one of the participants of JR Biotek Foundation's first training workshop held in collaboration with the International Institute of Agriculture (IITA) in Nigeria in September 2014. Catherine said the skills she gained from our workshop helped her a lot during her PhD in Texas. "I still have my laboratory manual from the training. In fact, it's sitting on my work bench in Texas because the knowledge and skills from the recombinant DNA technology module taught then, became very useful in my PhD research."

As lectures were held in the mornings, the hands-on laboratory sessions took place in the afternoons. The sessions focused on teaching basic molecular biology laboratory skills such as DNA extraction from plants, the Polymerase Chain Reaction (PCR), gel electrophoresis, and even micro-pipetting, as most of the candidates did not have experience in this before the workshop.

Dr Fernán Federici (Pontificia Universidad Católica, Chile) led the labware construction session during the workshop in Benin. The participants were involved in a hands-on build-a-microscope session, where they built portable fluorescent microscopes that were eventually used to monitor fluorescent protein expression in cell-free systems.

In addition, a professional development course was taught by Dr Matias Acosta, with the aim to provide information and knowledge on how to effectively write scientific publications and grant applications, give excellent scientific presentations at conferences or meetings, network and be a leader in science.

The 'Bio-innovation for Africa' pitching challenge was created by Carol Ibe to encourage African researchers and students to be more proactive and involved in finding practical solutions to some of the most pressing challenges faced in Africa.

The participants were grouped into 18 teams to develop new ideas and projects that can potentially address challenges in food and nutrition, research and innovation, science policy development and implementation, and STEM (science, technology, engineering and mathematics) education across the continent. Every afternoon, while one group was in the laboratory for their hands-on laboratory practical session, all the other groups worked on their ideas. On the last day of the workshop, all 18 teams pitched their new ideas for start-ups or non-profit organisations to a panel of expert judges. The judges gave constructive feedback and, shortly after, announced the winners of the competition.

OUR TAKE HOME MESSAGE

In our experience developing capacity building programmes for African researchers, it is evident that African countries need a new generation of researchers and bio-industry leaders who can drive innovation forward across key sectors on the continent. Rather than depending on tools or technologies tailor-made for developed countries, African researchers must be enabled to develop their own solutions because they have a better understanding of the problems and are better placed to solve them. This is the goal of the 'Reach & Teach Science in Africa' capacity building project. To equip African researchers with knowledge and technical skills they need to develop, lead and conduct world-class research that solves specific problems in agriculture, health care and the environment on the continent.

To learn more about JR Biotek Foundation and the Reach & Teach Science in Africa, visit our websites at www.jrbiotekfoundation.org and http://teachsciafrica.com/.

Special thanks to our sponsors for their generous contribution to the 'Reach & Teach' capacity building project.

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