

A Female Inventor Ahead of her Time

Akosua K. Darkwah Speaks with Veronica Bekoe

African scientists have responded to the pandemic by developing a range of largely low-tech innovations to either ease testing/treatment or assist with adherence to the containment measures imposed by various states. In Dakar, Senegal, students built a multifunctional robot that helped caregivers treat patients while minimising the risk of infections; in Nigeria, another student built a portable ventilator (BBC News, 2020). In South Africa, a scientist developed a COVID-19 rapid testing kit, and, across the continent, there are many automated handwashing devices, such as the one designed by nine-year-old Stephen Wamukota in rural Kenya (UNDP, 2020: 12). The media houses that have showcased the work of African innovators developing COVID solutions have tended to focus heavily on men, inadvertently giving the impression that women have not contributed to innovations in the last two years. Yet, women are also inventors. In fact, thirty-odd years before the global recognition of automated handwashing devices as a tool in the fight against COVID-19, Veronica Bekoe in Ghana developed one such device.

Born in Accra, the capital of Ghana, in 1943, Veronica Bekoe attended Aburi Girls Secondary School and then the Kwame Nkrumah University of Science and Technology, where she studied Biological Sciences, graduating in 1971. She is famous for having invented what has come to be known as the Veronica Bucket, a mechanism for hand washing. It comprises a bucket of water with a tap fixed at the bottom, mounted at hand height, and a bowl at the base to collect the waste water. In this interview, we focus on the educational and work life of Veronica Bekoe to understand the context and process by which she came to invent the handwashing mechanism which has proved crucial in the fight against COVID-19 in Ghana. Her story, like that of many other African inventors, also highlights the difficulties with patenting and upscaling which make it difficult, if not near impossible, for African inventors to benefit fully from their inventions.

The conversation has been edited for length and clarity.

Akosua K. Darkwah: Growing up, did you want to be a biological scientist or a doctor?

Veronica Bekoe: I did not want to be a doctor. For some reason, although I was geared towards the sciences, I did not think I could do medicine academically, given the sort of person that I am.

Akosua K. Darkwah: Were you one of the few women who was doing Biological Sciences at the time?

Veronica Bekoe: Actually, in my year, we were six - three boys and three girls. We were the first batch of the Biological Science students. I didn't keep track of those who came after us, so I don't know if the number increased or decreased.

Akosua K. Darkwah: Do you still have friends from that batch?

Veronica Bekoe: Sure, I do. I am still in contact with them. Yes, we were very good friends.

Akosua K. Darkwah: When did you finish university?

Veronica Bekoe: In 1971.

Akosua K. Darkwah: So, you didn't go to university right after secondary school?

Veronica Bekoe: I did my Advanced level (A level) first

Akosua K. Darkwah: In 1960?

Veronica Bekoe: I did my A level in 1962 and worked for some time.

Akosua K. Darkwah: Okay. Where did you work then?

Veronica Bekoe: Bank of Ghana.

Akosua K. Darkwah: So, you must have gone to university in 1968?

Veronica Bekoe: Yes, I had some health issues with my eyes, so I had to wait for a while.

Akosua K. Darkwah: What happened after you finished in 1971?

Veronica Bekoe: When I finished in 1971, I was supposed to be employed by the Ministry of Health. It was delayed till February 1972, when I was finally employed by the Ministry of Health and that's when my work life started.

Akosua K. Darkwah: Did you work at the Ministry of Health in Accra or Kumasi?

Veronica Bekoe: In Accra. I was posted to Korle-Bu Teaching Hospital. There was a public health laboratory in Korle-Bu. That was where I started my working life.

Akosua K. Darkwah: And what did you do there?

Veronica Bekoe: Remember I said I studied biology, so I had no clue what work in a medical laboratory entailed. So, whatever I did, I learnt on the job. I was lucky, I think, to have met the crop of workers that I met at that time, from the head right down to the cleaners. There was order, there was discipline. Everybody knew his place. There were many sections. One section worked on communicable diseases. Then, there was the tuberculosis section, the sexually-transmitted infections and the cholera sections. So, in every section, those who worked there had to take me under their wings and teach me on the job how to process the samples. Eventually, I was struck with cholera. We had to go to the field and take samples from people; we took samples from water bodies, people's cooking utensils and containers used to serve water, even the food. At that time, we were even testing food sellers periodically. We were working hand in hand with the Accra Metropolitan Assembly. Periodically, they would send a batch of samples and you would be amazed at some of the results we had. The *waakye* [rice and beans] sellers, the rice sellers too, they serve the rice with their hands. Some of them obviously had cholera. So, for a long time, I was doing work on cholera and general diarrhoeas and other diarrhoea diseases until 1986, the advent of HIV. That was when the first HIV case was detected in

Ghana. The Ministry of Health and Ghana Health Service were addressing the issue and, eventually, the decision was taken that the public health laboratories should come on board. I was one of the eight people selected to learn how to do the testing. There were so many different test kits. I think the country decided to use the Wellcome kit. So, somebody had to come down from the United Kingdom to teach us how to do the testing. That was how the HIV testing started in Ghana. Eventually, I was the only one left to carry on. I don't know exactly why.

Akosua K. Darkwah: Were there other women?

Veronica Bekoe: I was the only woman. The rest were all men.

Akosua K. Darkwah: So, at what point did you think of the buckets?

Veronica Bekoe: Having said that, it meant that all the training on the use of the [HIV] kits in the country fell on me, so I had lots of opportunities to train, and I had to do Training of Trainers for the whole country. In November 1992 or thereabouts, I got to know that USAID was going to help Ghana improve the public health laboratory system. So, they got a consultant whose name was Joanne Hettrick to come and help with the project. She needed somebody in this country to work with, and I was appointed by the head of the public health laboratory to work with her. She was not supposed to build laboratories, but to improve on the existing ones. But I remember I told you that there was just one laboratory for the whole country, and she had to undertake feasibility studies in the country with regards to the infrastructure and the personnel. I had to travel with her throughout the country to look at all these things. One of the areas we looked at was the prevention of infections. You know, laboratories deal with diseases and the public health laboratories deal with infectious diseases. So, we went round and what we noticed was that in the facilities where there was no running water, the people were using all sorts of things to wash their hands.

Akosua K. Darkwah: These were laboratories attached to hospitals?

Veronica Bekoe: Yes, remember we are not talking about public health laboratories now.

Akosua K. Darkwah: We are talking about regular laboratories.

Veronica Bekoe: Yes, regular diagnostics laboratories in the public sector from the hospitals with several employees right down to the health centre where you have one man stationed. Wherever we went, we did not only visit the laboratories, but we also looked at other departments as well: the labour ward, the doctor's office, and so on. In the facilities where there was no running water, people were using bowls of water, buckets of water. At best you could get two bowls: one for washing and one for rinsing. Sometimes, you would get a bucket with a cup. How do you wash your hands? Sometimes, it was only one bowl. So, it became a worry. At the end of each day, we had to write a report. I kept thinking about the fact that we needed running water to wash hands properly in the hospital setting. At that time, people were using covered aluminium containers to sell porridge. So, one evening, I told Joanne, "If we get one of these things, the medium-sized one, and fix a tap, won't it provide running water?" "That would work", she said. "Would we get someone to do it for us?" she asked. I said yes. So, there was a plumber, we had a family plumber.

Akosua K. Darkwah: What was this family plumber's name?

Veronica Bekoe: Musah; now he is no more. In fact, he died about four or five years ago. We lived at Nima then, so I told him about it, and he said he could make it. Those containers were sold at the market, so, since we were going to be going from one hospital to another, we needed a reasonably-sized one, and fixed the tap. I brought it in to show Joanne and we put water in it.

Akosua K. Darkwah: And voila, you had portable running water!

Veronica Bekoe: What we realised is that we had the normal metal tap and looking at the thickness of the aluminium container; we had to do several prototypes.

Akosua K. Darkwah: So those earlier ones were aluminium, not plastic?

Veronica Bekoe: No, no, no, they were not plastic. With that problem we changed to plastic containers.

Akosua K. Darkwah: So, all of these were made by Musah?

Veronica Bekoe: Yes, the aluminium ones. He also did the first plastic one, but what happened was that I made this bucket for the health facilities, for Ghana Health Service and the Ministry of Health. So, it was limited to the laboratories and, once you had a facility where the laboratory workers did not have running water, it was obvious other departments in the same facility would not have running water. Mind you, in each facility, when we went to do the training, it was not just for the laboratory workers, all the nurses and doctors were invited. So, when they realised what was going on, that we were using this container to provide running water to teach the laboratory workers how to get running water, the entire facility learnt about it. For a long time, apart from people I had direct contact with while teaching them, nobody knew who invented the bucket. Nobody knew me, but the bucket was in the system.

Akosua K. Darkwah: You and Mr. Musah, you moved from the aluminium to the plastic because that was more durable. Was it Mr. Musah who made the plastic bucket?

Veronica Bekoe: I had to go to the industrial area to buy the plastic containers in the size I wanted.

Akosua K. Darkwah: And then he fixed the tap. What made you think the plastic one would work better?

Veronica Bekoe: We tried. It was an experiment. I thought the metal tap was very heavy.

Akosua K. Darkwah: Then you got a plastic bucket, you fixed a metal tap and it worked.

Veronica Bekoe: Yes, and it worked. I even have one now.

Akosua K. Darkwah: Do you have some of the earlier ones?

Veronica Bekoe: The aluminium one? I threw some things away last week.

Akosua K. Darkwah: Including your invention? Where did you throw it? Have the garbage collectors come for it?

Veronica Bekoe: The one with the metal tap was too old.

Akosua K. Darkwah: So, other people started making it?

Veronica Bekoe: The health facilities just got the plastic container and got a plumber. So later on, I realised that schools started using them, as did private maternity homes. The private midwives' association invited me several times to give training to their members. So, they also started using them. Later on, eateries started using them on a small scale, so it was out there. Nobody had any idea where it was coming from till the advent of COVID. To be honest, I did not know what was happening, until one day I was driving down this road. If you drive down this road now, you will see a lot of them. Then people started calling me, I don't know how people got my contact or number. People just started calling me. The few buckets that I made actually had my telephone number on them, but this was long before COVID-19, in early 1993.

Akosua K. Darkwah: That would have been a landline, not a cell phone number.

Veronica Bekoe: I still don't know how people got in touch with me. I don't remember. I started getting telephone calls from the media.

Akosua K. Darkwah: So who named it the "Veronica bucket"?

Veronica Bekoe: So, Joanne said, since I came up with the idea, it should be named the Veronica Bucket. She died about four years ago. I was with her. She was in New Mexico. I stayed with her for two weeks before she died. Normally, when I went to visit my daughter, I visited her and, on that occasion, I got to know that she was not well. I stayed for a bit and two weeks later I was called.

Akosua K. Darkwah: So, she named it the Veronica Bucket, but you did not patent it.

Veronica Bekoe: I attempted it, but it was too frustrating. I was advised to patent a brand, a specific brand. I submitted the first batch of documents, but it has been over a year, and I have not heard from them. I paid the equivalent of \$200. Look at me, now I have time but then I didn't have the time. I was at work at 7 o'clock in the morning and at 5 p.m., I had to go home to my five children. I did not have time then. Sometimes, on my way to work, I would pass by the Registrar-General's office, or when I finished work a bit earlier than usual, but the thing is, that was not the motive, I did not design it to make money out of it. The objective was to help us to prevent and minimise infections through our hands because these hands were used in the laboratories and these same hands were used for everything. That was not the objective. This thing has been in existence for over 30 years. Without COVID-19, you would not be sitting with me now, so that was it.

Akosua K. Darkwah: But it means that now you have no control over all the versions, and nobody gives you money.

Veronica Bekoe: Even the government has not bought one bucket.

Akosua K. Darkwah: Do you make some yourself? Do you have someone making some for you?

Veronica Bekoe: Yes.

Akosua K. Darkwah: So, apart from the media calling you for interviews, has any government institution called you?

Veronica Bekoe: I have done something featured on Ghana Broadcasting Corporation and in the Daily Graphic [the most widely circulated paper in Ghana]. There was a whole page on me.

Akosua K. Darkwah: But have you received state recognition for your efforts?

Veronica Bekoe: In 2019, for International Women's Day, I was at home when one of my colleagues from the National AIDS Control Programme (I worked there when I left the public health laboratory) called to say that the First Lady's secretary wanted

my number. So, I was told to expect a lady from her. She called and said the First Lady, Mrs Rebecca Akufo-Addo, was inviting me to a get-together on International Women's Day. She did not tell me anything else. On the day of the event, she called to make sure I would attend the event. When I got there, she called again to make sure I was at the event. Apparently, some women were going to be honoured, and I was first on the list. In 2005 as well, at the end of the year, the Ghana Health Service honoured me for the invention of the Veronica Bucket.

Akosua K. Darkwah: You were recognised by both the Ghana Health Service and the First Lady, even before COVID-19?

Veronica Bekoe: Yes.

Akosua K. Darkwah: How do you feel about having invented the bucket?

Veronica Bekoe: I feel blessed and humbled, because this was 30 years ago. It was within the health sector. Even the people in the health sector did not know who I was nor how the whole thing came about. Everybody was calling it the Veronica Bucket but they had no clue why. Even when I was working at the National AIDS Control Programme, my boss told me that the accountant asked him why the bucket was called the Veronica Bucket. You know, I feel very humbled that this small thing I thought I was creating to help people to prevent infectious diseases on the job has become something that is used worldwide beyond the shores of Ghana. I sent some to Portugal through the Ministry of Health, and to Ivory Coast, South Africa, and the southern and eastern part of Africa, all before the advent of COVID-19.

Akosua K. Darkwah: And you are not upset that others are making money off of it because you did not patent it?

Veronica Bekoe: I am upset but what can I do? I do not worry myself over things I cannot control. If I worry, where would that take me? It will rather raise my blood pressure. I have this philosophy; if it is yours, it will come. No matter how long it takes, I will get what is mine. Remember, I did this 30 years ago. I never knew it would even be recognised worldwide. It is now on Wikipedia. I do not worry about things I cannot control.

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