Text message from the Congo

By Peter H. Kilmarx, MD, FACP, FIDSA

Baka tombi moyo wa disanka.
Lufu lua buni be wa ebola.
Udi ulua ngondo kayi bua hospital?
Munyi moyo, muhulu pierre?

That was the text message I received at my home in Atlanta from Shamba Gilbert, a traditional chief of Bakwa Tombe, a small village in the Democratic Republic of Congo, at 2:30 am on August 30, 2007. He wrote in a mixture of Tshikete, the local language, and Tshiluba, the regional language, but I could make it out to mean, "Bakwa Tombe greets you with pleasure. There is a lot of death from Ebola. When are you coming to build a hospital? How are you, Peter?"

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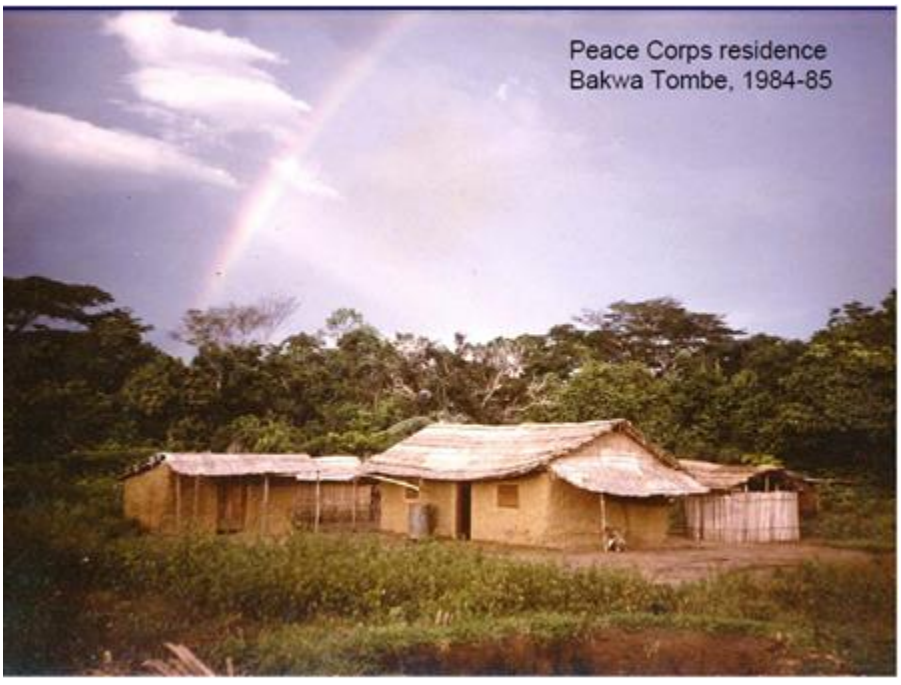
I had been a Peace Corps Volunteer in Bakwa Tombe from 1984 to 1986. I was the first and only Westerner to live along the unpaved road stretching north and south 70 kilometers between the towns of Mweka to the north and Luebo to the south, the seats of government of two zones in the Kasai Occidental region of the country. Bakwa Tombe was exactly halfway in between, a small village of about 1,000 people, subsistence farmers and their families. I lived in a mud hut with a thatched palm roof. No one, including me, had electricity, running water or flush toilets. I had the only motorcycle in town, a 125 cc Yamaha. The people were poor, and many were protein malnourished. My job for two years and that of my two Peace Corps volunteer successors was to introduce aquaculture—fish farming with tilapia in hand-dug ponds fed largely with plankton blooms established with compost and animal manure. The program was reasonably successful. At the end of two years, I was working with about 20 farmers in a half-dozen villages in a 20-kilometer radius. Most had one pond, a few had two; one hard-working man named Kapalwe, who lived on the edge of the village, had four ponds. He was also a prophet, given to walking through the village day and night loudly proclaiming that we should prepare ourselves for the Second Coming: "*Bongesha! Bongesha! Bongesha! Bongesha mutshima weba!*" Literally, "Prepare your liver well."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We stocked the ponds with tilapia fingerlings, one per square meter, initially brought in plastic 5-gallon jugs in burlap panniers on my motorcycle from the farmers working with the volunteer 50 kilometers away, north of Mweka, but eventually shared between the farmers I worked with once their ponds were established. With hard work, a farmer could expect to drain the pond after six months and retrieve the initial fingerlings, hand-sized at harvest, plus hundreds of their progeny fingerlings and thousands of tiny fish, which children would spend hours after the harvest picking out of the mud. A good harvest might yield 30 or 40 kilograms of fish from a 100-square-meter pond.

Fish farmer and pond with plankton "bloom"

Zaire, as the country was called at the time, was extremely poor and underdeveloped despite a wealth of natural resources. The human development index placed Zaire in the bottom tier of countries. The President, Joseph Mobutu, had seized power in 1965 and ran what was called a "kleptocracy," amassing a personal fortune at the expense of the nation over a period of widespread human rights violations, uncontrolled inflation, malnutrition and, ultimately, what was called Africa's first world war. But Mobutu enjoyed strong support from the United States, which believed he opposed communism in francophone Africa, and Zaire had one of the largest Peace Corps programs worldwide.

It was also a big, beautiful country, the size of the United States east of the Mississippi, with a bold, beautiful culture that included dance music popular throughout Africa. It was said that Peace Corps Zaire had the highest rate of volunteers dropping out in their first year but also the highest rate of volunteers extending for a third year of service. I was fortunate to be posted in Mweka zone, home of the Kuba people, whose distinctive masks and fabrics are found in museums and hotel lobbies worldwide. I found it very challenging, especially the loneliness of being the only Westerner for 35 kilometers. There were no telecommunications in Mweka in the 1980s. In two years I had only one brief, expensive call home from the national telecommunications office in Kinshasa, the national capital. My parents were able to come for a

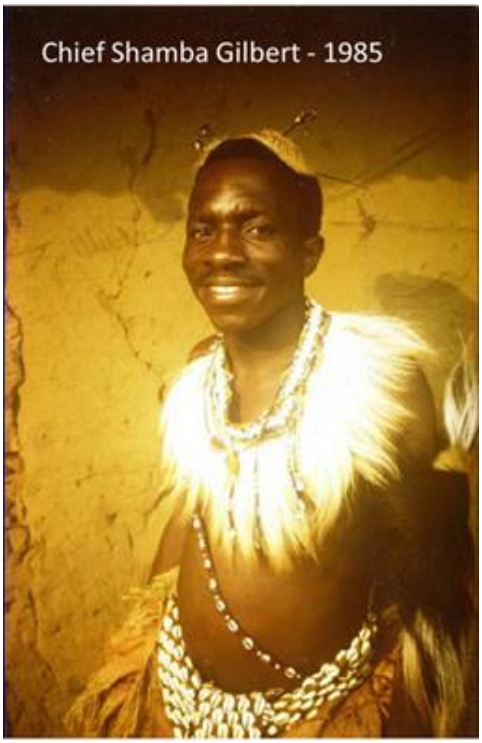
visit in 1985. I made a bedroom for them in my motorcycle shed and they took turns riding on the back of my motorcycle to visit the fish farmers and their ponds in the surrounding villages.

I had completed the pre-med requirements as an undergraduate but did not feel sufficiently mature or motivated to begin medical school. I thought Peace Corps service would give me an opportunity for adventure, experience and insight into my future. Within the first year, the farmers I worked with started naming their newborn sons after me. This was a big honor, and I was very saddened when one of the baby Pierres died, reportedly of measles. “How could someone die of measles when we have a vaccine?” I naively wondered, having recently received a booster shot. I started educating myself about public health and decided, yes, I was ready for medical school.

Back Home with a ‘Benefit’

Back home in Rhode Island for the summer after my Peace Corps service, I enjoyed my first professional “benefit.” I was infected with tiny blood worms, microfilaria, and my blood eosinophil cell count, which is normally under 5%, was a whopping 50%. Dr. James Crowley gave me a summer job at Rhode Island Hospital in his hematology laboratory developing a test for antibodies to eosinophils using my own cells! At the end of summer, I came down with a fever shortly before starting classes at Dartmouth Medical School in Hanover, NH. It felt like a recurrence of malaria to me, which I had had every few months as a volunteer despite taking prophylaxis, but, being at an academic medical center that didn’t see a lot of malaria cases, I was hospitalized for five days and had a lumbar puncture, bone marrow aspiration and biopsy, and multiple phlebotomies before they finally diagnosed malaria, gave me chloroquine and I went home the next day — tired but much better equipped to understand the patients’ perspectives as a first-year medical student. I later learned that the doctor who first saw me in the emergency room, one of our medical school faculty, felt so ill-equipped to manage my case that he subsequently retreated to his subspecialty and no longer practiced general medicine. And the infectious diseases attending physician still uses my case for teaching, more than 30 years later.

After the first year of medical school, I received a small grant from a drug company to return to Zaire and conducted a survey of men’s knowledge, attitudes and practices related to HIV and AIDS, which was a relatively newly recognized phenomenon in Africa in 1987. Being able to talk freely with many fish farmers about topics including anal sex, sex during menses and male-male sex, I was able to get some unique insights. I had many discussions with Chief Shamba, who noted that the popular song “Attention na SIDA” (“Beware of AIDS”) by the great Franco Luambo was very influential in changing men’s behaviors, including his own. Shamba also became my most reliable correspondent; we exchanged letters every year or so about news from the village and our growing families. Before I traveled to Zaire, I attended the Third International AIDS Conference in Washington, DC. I was impressed with an epidemiologist from the CDC who had been seconded to WHO Africa office in Brazzaville. I thought, “When I grow up, I want to be one of those CDC guys in dark suits who make presentations on HIV statistics in Africa at big international meetings.”



Seven years later, after completing medical school, an internship and residency in internal medicine, and clinical infectious disease fellowship, I joined the incoming 1994 class of the CDC Epidemic Intelligence Service (EIS), their two-year post-doctoral training program. Near the end of my first year in 1995, there was a large Ebola outbreak in Kikwit in the Congo. Since I spoke French and was familiar with the Congo, I was in the second wave of CDC epidemiologists who were deployed for a month to work with Congolese health officials and WHO in the response. I worked under the expert direction of CDC's Dr. Ali Khan with about 40 medical students on household surveillance, visiting the quarantined households of Ebola patients to immediately detect and isolate anyone who became symptomatic. The day before I departed, I suited up in personal protective equipment with careful guidance from fellow EIS officer Dr. Scott Dowell and went on rounds with the medical team in the Ebola treatment unit at Kikwit General Hospital.

I needed to get back to the United States to continue work on a study of access to medical care for people diagnosed with HIV in sexually transmitted disease clinics. I flew from my home in Atlanta to Baltimore and spent the week interviewing dozens of people with HIV who had been diagnosed six to 24 months earlier. At that time we didn't have any guidance about restricting contacts after returning from an Ebola response, and while in Baltimore, I also attended a Beach Boys concert at Merriweather Post Pavilion and an Orioles game at Camden Yards. I flew home on Friday in time for my moonlighting job on Saturday seeing a dozen infectious disease patients at a half dozen hospitals in Atlanta. Then I woke up at 2 am Sunday morning with a 100.5° fever, just over a week since I had been on the Ebola ward. My first thought was that I had Ebola, which had at least a 50% mortality rate, and was going to widow my wife and 2-year old son. My second thought was for all the people I had exposed and what a headache and public relations crisis this would be for CDC and for the EIS officers who would have to trace all my thousands of potential contacts. It was only from still-uncompleted research in the ongoing outbreak that we confirmed that Ebola was not airborne and that patients were not infectious before they became symptomatic. My plan was to call the CDC's legendary Special Pathogens Branch Chief Dr. C.J. Peters first thing in the morning and report my situation. But before going back to bed, I thought, "Perhaps the fever could also be from sinusitis." I took tablets of ciprofloxacin, doxycycline, metronidazole, acetaminophen and ibuprofen from my travel medical kit and woke up feeling much better – not Ebola after all!

My CDC career took me to Thailand for six years and Botswana for three years, then back to Atlanta in 2005. In June 2007, I received an annual update letter from Shamba. It had been written in January and mailed from Haiti in May, perhaps hand-carried there by a traveler to use a somewhat more reliable mail system. Remarkably, Shamba listed three mobile phone numbers in the letter. There was mobile cell service in Kasai Occidental! Not in the village of Bakwa Tombe, but in the towns Luebo and Mweka. Shamba was working at the missionary hospital in Luebo, and we exchanged text messages and had a few short phone conversations, our first in 20 years.

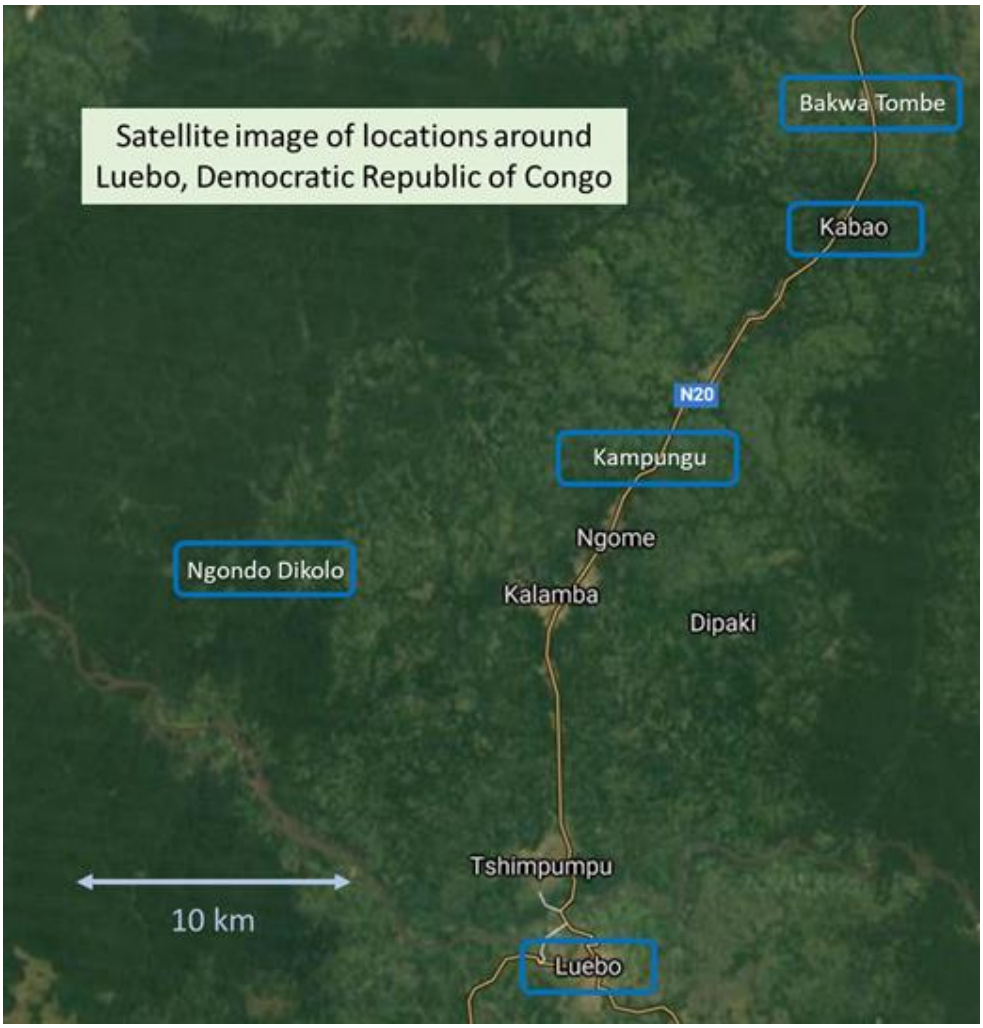
Sounded Like Ebola But Needed Confirmation

When I received his 2:30 am text message on August 30, 2007, I thought, "He's a village chief, what does Shamba know about Ebola?" and went back to sleep. The next morning I emailed Ali Khan and Scott Dowell and asked them if they knew anything about an Ebola outbreak in the Congo. No, they didn't know about an Ebola outbreak. I texted Shamba and told him to find the Luebo hospital director and call us. Several days later, they texted me. I called them right back and teleconferenced-in Scott Dowell and also Dr. Ray Arthur, who worked with Scott in the Global Disease Detection office at CDC. The hospital director, Dr. Mamba, described the number and geographic extent of cases, the signs and symptoms, which included hemorrhaging, and high mortality rate. He mentioned that a typical scenario was that family members would transport a patient to the hospital by pushing him on a bicycle, then also fall ill a few days. We agreed that it sounded a lot like Ebola but needed laboratory confirmation.

Although I was working in the HIV/AIDS program, I was able to convince my supervisor to let me return to the Congo. After all, I had been name-requested by the village chief! I spent the next few days meeting with CDC Ebola experts and gathering equipment and materials. Meanwhile, Dr. Bill Clemmer, the physician at the Bulape mission hospital north of Mweka, had

collected blood samples from some patients and sent them to CDC. On my way to the airport, I received a call from Dr. Pierre Rollin, another well-known Ebola expert who worked in the CDC special pathogens laboratory. He let me know that Ebola had been detected in six of the 15 specimens they had received, which was reassuring in a way because we knew how it was transmitted and how to prevent it, although we did not have any effective antiviral treatment. I picked up my passport with an emergency visa for the Congo from the Delta Dash counter at the Atlanta airport and boarded my flight.

CDC had a small office implementing HIV/AIDS programs based in Kinshasa, and they welcomed me onto their team when I arrived on September 12. Karen Hawkins-Reed, a deeply experienced public health adviser, was the CDC Chief of Party and Dr. Ginaluca (Luca) Flamigni, a gregarious Italian with a shaved head, was their medical epidemiologist. We attended the National Ebola Control Coordination meeting in Kinshasa co-chaired by the Ministry of Health and WHO. They reported that the first cases were believed to have been in April and had first been reported by local health clinic personnel in August. By late August there were over 100 cases reported and a team from Médecins Sans Frontières (MSF) established a treatment center in Kampungu, the most heavily affected village, north of Luebo and 15 kilometers south of Bakwa Tombe, in early September. By September 7, there were 352 cases reported with 160 deaths, a mortality rate of 45%, typical of Ebola but complicated by a suspicion that there were also cases of shigellosis and typhoid fever and no laboratory to make a diagnosis.

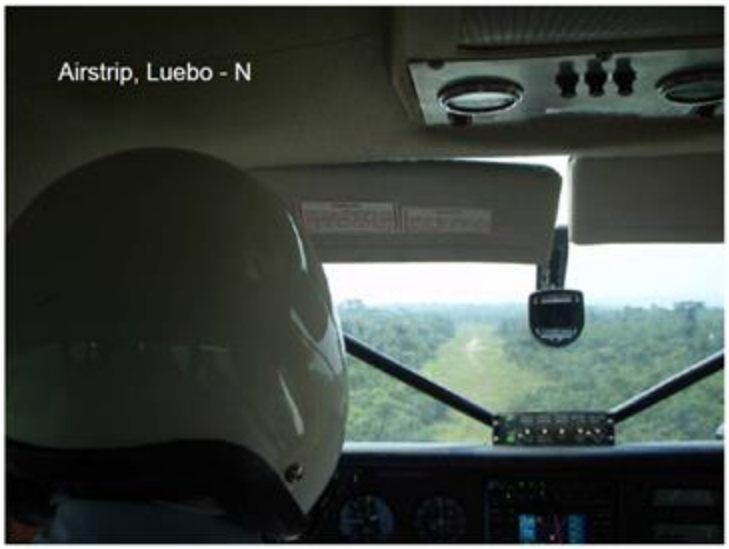


We planned a field visit to Mweka Zone, over a thousand kilometers from Kinshasa. It would have taken several days to drive on the very poor roads, so we chartered a flight with the Mission Aviation Fellowship with Greg Heller as our cool and calm pilot. On our first outing on September 13, the plane's single engine started misfiring after takeoff, so we returned to the airport. With only one engine, there's no margin of error. On September 14, we set out again with Bill Clemmer and Luca Flamigni. In two days we visited Mweka, Luebo, Kampungu and Kananga, the regional capital, with the primary goals of rapidly determining the extent of the spread of Ebola and assessing the infrastructure options for locating a laboratory and response coordination center. Our secondary goals were to assess the current response efforts and to facilitate communication and coordination among the several response teams.

We established that most cases were in a few villages 10 to 20 kilometers north of Luebo. They were technically in Mweka Zone, but were actually much closer to Luebo town, about a 30-minute drive, than to Mweka town, which would have taken two hours to drive the 50 to 60 kilometers to the villages. As is often the case, there was a "fog of war" kind of confusion over the exact extent of cases, and a combination of some localities hiding cases due to fear and stigma, with other localities making false reports in an effort to attract additional resources. We recommended basing the response effort in Luebo, which on the north and south sides of the Lulua River offered two airstrips able to accommodate small planes, a hotel, guest houses and two small, ill-equipped hospitals – one government and one missionary. In the village Kampungu, where MSF was based, they were in the heart of the outbreak but had very poor infrastructure, sleeping in small tents and working in mud huts with no source of water, no airfield and no cellular telephone signal. In addition to establishing laboratory capacity for Ebola testing, we recommended a rapid scale up of additional interventions with unified surveillance, contact tracing and case confirmation; improved case management with personal protective equipment, barrier nursing, infection control; and increased and improved public communication efforts.


Meeting in Luebo
With Drs. Mamba and Bill Clemmer


Luebo – S airfield


Airstrip, Luebo - N

I spent the next few days in Kinshasa briefing the Minister of Health and U.S. Ambassador, upgrading computer and communications equipment with outstanding support from the Congolese CDC staff, and setting up contracts to support the team in the field. A key contact was Dr. Larry Sthreshley. He had been born in the mission hospital in Luebo and was leading the U.S. Presbyterian Church's extensive health programs in the Congo. He assigned David Law, an engineer and second-generation Congo missionary, to set up our accommodations and Ebola laboratory at the Luebo mission hospital. Their deep knowledge of the country and how to get things done was invaluable.

CDC Response

We returned to Luebo on September 19 and were followed over the next week by about 10 members of the CDC Special Pathogens Branch, led by two other highly competent and experienced researchers, Drs. Tom Ksiazek and Stuart Nichol. We were able to improve coordination somewhat by initiating regular meetings in Luebo with representatives of WHO, led by Dr. Florimond Kweteminga Tshioko, an Ebola expert and native of the region, as well as the Ministry of Health, MSF, Red Cross and local health and government authorities in Luebo, and forming technical working groups for surveillance, communications and other response activities. A critical link was between the CDC laboratory in Luebo and MSF in Kampungu. How should specimens be collected? What time would they be picked up? What was the expected turnaround time and how would results be communicated? Three metric tons of laboratory equipment were transported by air from Atlanta, minor renovations of chosen laboratory space were completed and specimen processing with same-day results began on September 27.

The days were long and the work, while sometimes frustrating, was very gratifying. I felt a strong bond with the people of this area who had opened my eyes and kept me safe for such a powerful, career-defining experience in the Peace Corps. It was like a dream come true to have my connection to them and knowledge of the geography, the culture and the language be so helpful. As we sped on our motorcycles, running late to a coordination meeting, I knew just how fast to ride safely on the combination of sand and clay in the local roads. When the lab received a batch of specimens and was wondering where they came from, I could look at the patient names and report that with so many Bopes, Mambas and Shambas, they were from Mweka or Luebo and not from Kananga as they had been told. One of my favorite Tshiluba proverbs seemed very appropriate, “Bidi bikengela kulala mu nzubu wa muntu mukuabo bua kumanya mvula udi ulota muaba kayi,” which is to say, “You have to sleep in another man´s house to know where the roof lets the rain in.” I felt like I had done that.

We also investigated the origin of the outbreak. The news media had focused on two village chiefs who died in June. We drove to the Makonoko Health Center and spoke with the nurse-director, Mr. Emile Mbantshi ,who had reported the initial cases to his supervisors. He was very helpful and confident that the chiefs had died of other causes in May and June and none of their contacts had fallen ill. He asserted that the first case was a 60-year-old female subsistence farmer who had died on July 3 despite treatment with intravenous antibiotics. Her symptoms included bloody vomiting, a known complication of Ebola, and she had no known contact with the deceased chiefs, their cadavers or any other prior suspect cases. Notably, 11 of her family members subsequently died of Ebola-like illness.

We learned that the early suspect cases lived in an “abandoned” village 12 kilometers west of the Mweka-Luebo road. Historically, villages moved when the surrounding land was depleted of soil nutrients and game. The village of Ngondo had moved to be on the road, but some people maintained huts and farmland and hunted at the old village site, called “Ngondo dikolo.” The day after we interviewed him, Emile rode on the back of my motorcycle and with Luca and a local guide on his motorcycle, we set out to the old village in the forest, occasionally lifting our bikes over downed trees across the footpath. We met with the male elders present and learned

that the village had a population of about 250 and a high poverty level with no school or health clinic. They reported very frequent hunting and consumption of bush meat, including monkeys and fruit bats, and that there was no prohibition against eating forest animals found dead. I remarked that I had lived in the area for two years and never saw fruit bats. They said the bats were migratory, only present in dry season in April and May, and were found farther to the west along the Lulua River.

Dr. Luca Flamigni and guide on path to Ngondo dikolo

Discussion in Ngondo dikolo, Emile Mbantshi seated R

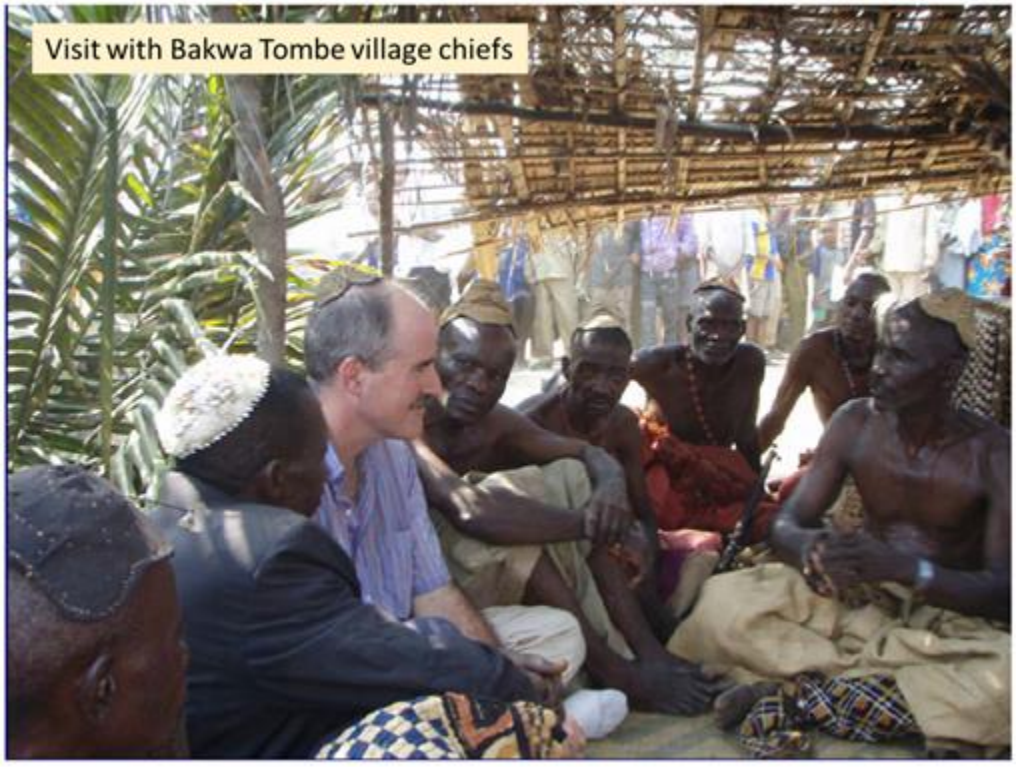
One man asked if they should stop eating bats. This was not easy to answer. Our Peace Corps aquaculture project was intended to combat protein malnutrition, and conditions had worsened in the intervening decades. Bush meat was a significant source of protein for these villagers, and this was their first known Ebola outbreak. The most I felt comfortable saying was that they should not eat any dead animals they found and should wash their hands after butchering or handling raw meat. In retrospect, perhaps I should have given a stronger response. The same villages had another outbreak the following year with a nearly genetically

identical virus. This may have been from another instance of the virus jumping to humans from bats or another species. Or it might have been from cryptic, low-level human-to-human transmission from 2007 to 2008. Another possibility was delayed sexual transmission in 2008 from someone who was infected in 2007, which was later documented in West Africa.

A Return Trip to Bakwa Tombe

The following day, my last full day in Luebo, Luca and I motorcycled 35 kilometers up to Bakwa Tombe, my first visit in 20 years. This was a big event in the village, with men wearing the village masks, warriors and dozens of women in traditional dress dancing to the drums, and with hundreds of onlookers. We sat on mats on the ground with the village chiefs under a palm thatch awning. Chief Shamba led the discussion and translated for me from Tshikete to French. The chiefs, bare-chested in raffia skirts and skullcaps, demanded that we build a hospital for them. I explained that it was one thing to build a building, but a hospital needs staff, medicine, equipment, running water and electricity, which were still not present in the village. As they insisted, I replied that we had brought a laboratory to Luebo, MSF was providing medical care and the Ebola case numbers were already declining. Realizing they weren't going to get a hospital, the tension eased, and we talked more generally about the difficulties the village continued to face.


Bakwa Tombe warriors

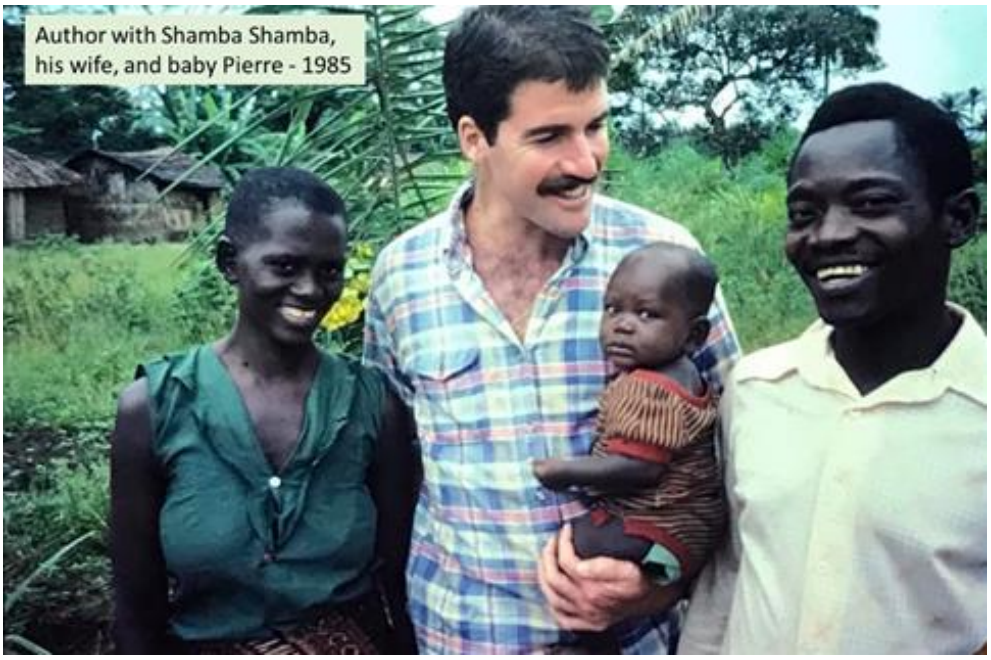

Visit with Bakwa Tombe village chiefs

Before we left, we went to visit the fish ponds closest to the village that had been built by a farmer named Palamba and his family, about a 15-minute walk down into the forest. Palamba had died years earlier and it was remarkable to see his sons still fish farming two decades later. The pond walls were not as wide and the plankton bloom was not as green as one would like. And when they threw some termites in the water, the tilapia did not immediately eat them. I grumbled to the dozen people on the pond bank that they didn't seem to be feeding their fish very consistently. As the group headed back to the village, feeling somewhat deflated, I lingered

and was the last to leave. As soon as the others stepped away, the fish started feeding vigorously; they were just afraid of all the people crowding around them. I apologized to Palamba's sons and we returned to the village in good spirits.

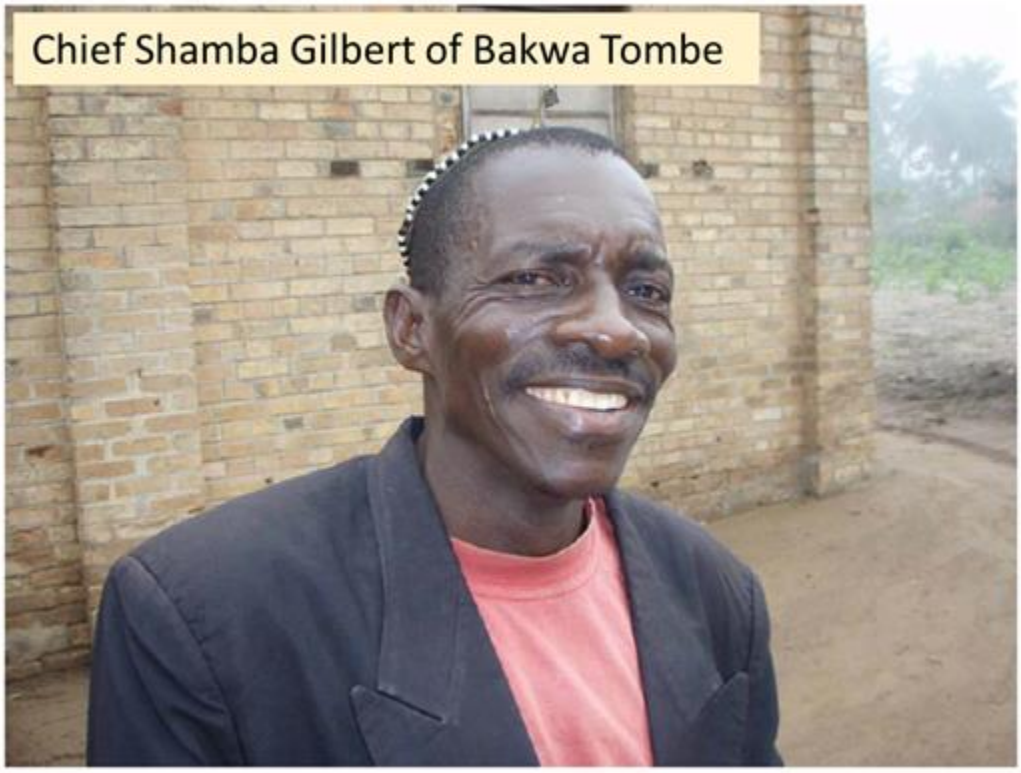

Bakwa Tombe *Tilapia* pond

After saying our goodbyes, with no hugs or handshakes during an Ebola outbreak, Luca and I headed back south toward Luebo on our motorcycles. We stopped in Kabao, a small village five kilometers along our way. As a dozen people crowded around to see who we were, a villager with a warm smile stepped forward and greeted me by name. He was Shamba Shamba, one of my last fish farmer recruits, and I had not thought of him for years. He had two wives and had named a son after me. I asked him if he was still fish farming. He exclaimed, "Oui, c'est un bon travail!" ("Yes, it's good work!") He showed me a photo of Pierre, now 22 years old and a recent graduate of the University of Lubumbashi. Shamba said the fish farming had helped feed Pierre and pay for his school tuition. He asked me to wait and ran back to his tiny hut with thatched palm walls and roof. He came back with a small, thick, dog-eared Bible from which he pulled a photo of my mother holding newborn baby Pierre from when my parents had visited in 1985, 22 years earlier.

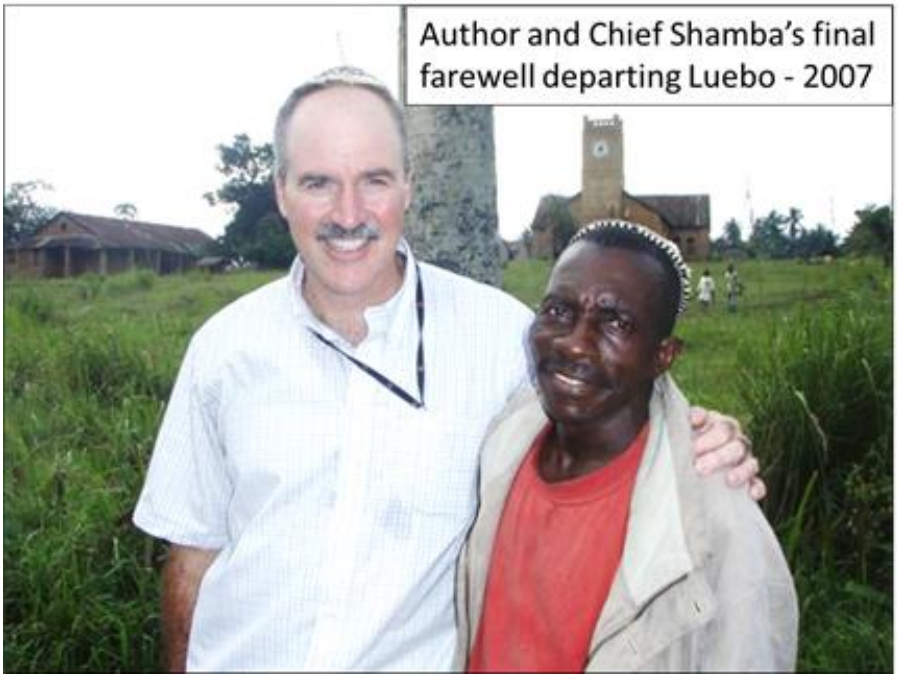


As we continued south on our motorcycles, there were tears in my eyes. My mother had died five years earlier and her absence was still strongly felt. I was overcome with the enormity of the confluence of connections, coincidences, friendships and struggles in our lives, personal and professional, to know and help each other and fight poverty, malnutrition and disease. There's a lovely phrase in Tshiluba, "*Muntu ne muntu, badi bambaluishangana*," literally, "Person and person, they help each other."

Chief Shamba met me at the airstrip the next day. He'd had a lung condition and was not well. He had been such a good friend and supporter when I was in the Peace Corps and had faithfully written to me almost every year since then. Now he had reported an Ebola outbreak in his village and had helped educate the people about the risks of Ebola and how to prevent it by not touching ill persons and cadavers. In an epidemic response, speed is critical. In earlier Ebola outbreaks there were months of delay before there was international awareness. But as a citizen-epidemiologist, Shamba was able to send a text message resulting in a CDC response in a matter of days. In a few years he would be dead, but I would stay connected with his son, also named Pierre, who was born in 1988, two years after my Peace Corps service. I had learned from Shamba about what the disaster responders call "community self-rescue." It can be a very powerful intervention to give people the basic knowledge and tools they need to help themselves. We saw this again when I was the CDC team lead in the Ebola response in Sierra Leone in 2014 and in Guinea in 2015, where transmission finally came under control when traditional leaders were educated and empowered to intervene. Community leaders are the experts on their communities. They are best positioned to recognize and report when something is amiss, and if they can be taught the basics of how people can protect themselves, they know best how to accomplish it in their own contexts.



As we said our last goodbye, I asked, “Shamba, you’re a village chief. How did you know it was Ebola when you sent me the text message?” He replied, didn’t I remember? After the Kikwit Ebola outbreak in 1995, 12 years earlier, I had written him a letter with a description of the manifestations and epidemiology of Ebola. “If you ever see something that looks like this,” I had written, “Let me know.”



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Disclaimer: The views expressed in this article are solely the responsibility of the author and do not necessarily represent the official views of the NIH.

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