

# ONE HEALTH RESEARCH IN CAMEROON: A CRITICAL ROLE FOR ANTHROPOLOGISTS

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## Introduction

One Health is a conceptual framework that views animal, human, and environmental health as an integrated whole. The One Health approach views solutions to human health problems as beyond the scope of human medicine alone, arguing for a holistic approach that incorporates human, animal, and environmental health perspectives and research methods. This approach demands the involvement of researchers from a wide range of fields to ensure the expertise needed to tackle such multi-faceted health issues.

The importance of social science in One Health is present in its origins. Calvin W. Schwabe (1970), a veterinary epidemiologist, was one of the first scholars to promote the One Health approach. He realized during his work with Dinka pastoralists that minimizing disruption to pastoralist livelihoods was essential for human and animal care. The rise of emerging infectious diseases, many of which are zoonotic and affect both humans and animals, has drawn attention to the One Health approach and its potential application to epidemiological research beyond pastoralist settings (Min, Allen-Scott, and Buntain 2013). Although the One Health approach is growing in popularity among biological health science researchers, the involvement of social scientists in general, and particularly anthropologists, is still lacking (Wolf 2015). Using our experiences with two projects in Cameroon, we make the case for how anthropologists can

significantly contribute to One Health research. We focus on three main areas: (1) how long-term anthropological research can facilitate the building of international and interdisciplinary teams needed to conduct One Health research; (2) the critical role participant and direct observation have in identifying and answering One Health research questions; and (3) how the rapport and trust that anthropologists establish with community members can help guide the development of sustainable solutions to local health challenges.

## Building a Better One Health Team: The Importance of Long-term Engagement on the Ground

Our engagement in One Health research began when Rebecca Garabed (Preventive Veterinary Medicine) and Mark Moritz (Anthropology) started a conversation about understanding the ecology of infectious diseases in pastoral systems. Moritz had been studying pastoralists in the Far North Region of Cameroon since 1993, while Garabed was interested in modeling the spread of infectious disease, particularly foot-and-mouth disease in livestock and wildlife populations. Drawing on Moritz's long-term research program in the country and on professional connections with researchers at Cameroonian universities, they were able to build the international and interdisciplinary team of scholars required to undertake the work of modeling foot-and-mouth disease in an endemic setting. Moritz's long-term research with pastoral communities facilitated the team's access to the communities and their herds, as well as allowed them to design a research proposal that considered the meaning and context of pastoral mobility. In fact, the research team credits the thoughtful and informed integration of the

human dimension into the study of foot-and-mouth disease for their success in securing funding from the NSF program in Ecology and Evolution of Infectious Disease.

That initial project led to the formation of the Disease Ecology and Computer Modeling Laboratory (DECML) by Rebecca Garabed (Preventive Veterinary Medicine), Mark Moritz (Anthropology), Song Liang (Public Health), and Ningchuan Xiao (Geography) in 2009. The interdisciplinary lab has since been the home of faculty, post-doctoral researchers, and graduate and undergraduate students from a wide range of disciplines, including anthropology, geography, public health, environmental health sciences, veterinary medicine, entomology, mathematics, computer science, urban planning, and ecology from the Ohio State University (OSU) and collaborating institutions in Cameroon, including the universities of Maroua and Ngaoundéré and the National Veterinary Laboratory (LANAVET).

All DECML members have spent extended, and in most cases, multiple stays in the field. This has allowed each member of the team to build upon Moritz's original network and expand the research capacity of the lab through the addition of new disciplines and perspectives. The interdisciplinary networks formed by DECML researchers have generated a number of new research projects, including ones integrating ethnographic methods, epidemiological research, and computer modeling to study human and animal infectious diseases.

## Anthropological Contributions to One Health Research: Critical Insights Provided by Direct and Participant Observation

The integration of ethnographic methods into the lab's One Health research played a critical role in the development of the CANARI<sup>1</sup> project. Undergraduate, Jessica Healy-Profitós joined the lab as part of

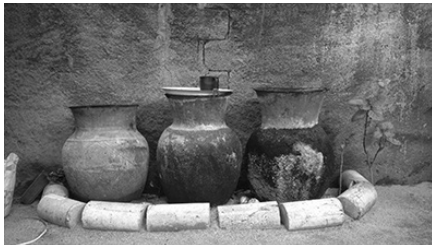


Figure 1. Three Canaris in a Maroua Courtyard

her honor's research project focused on understanding how herders managed their sick animals and how management styles impacted herd fertility.

When not collecting data in the pastoral communities, Jessica spent her days with the family of one of the Cameroonian team members who lived in Maroua, the capital of the Far North Region. Although she was not with the pastoralists, Jessica continued to apply direct and participant observation in Maroua and noted that piped water was uncommon. Instead, people faced an array of challenges obtaining water, with most relying on an informal market of water suppliers who collected water from public or private municipal water faucets and then sold it house to house. Within their home compounds, people then stored the purchased

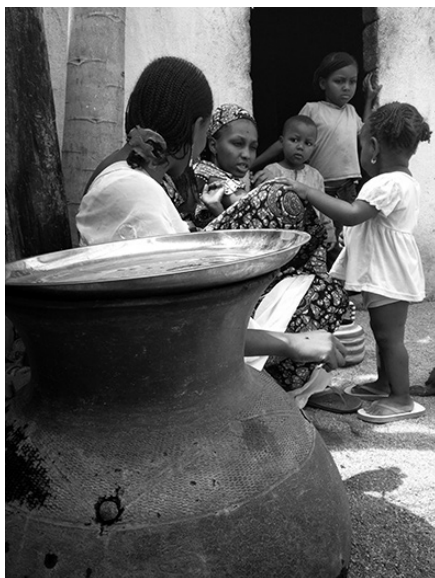


Figure 2. Family and Their Canari



Figure 3. Animals in Household Compound

drinking water in large clay jars, called *canaries*, which they partially buried in the ground in effort to keep the water cool (Figure 1 and Figure 2). Over the course of the day, people would dip their hands and communal cups into the canaries to obtain drinking water. Livestock and small wildlife, such as lizards, also had access to the canaries (Figure 3). While conducting fieldwork, Jessica learned of recent cholera outbreaks in the area and that diarrheal disease was a common health concern in the region. These observations led her to question if the canaries served as potential vectors for waterborne diseases within household compounds and the region.

Jessica's anthropological training had exposed her to the importance of "being there"—allowing research questions to naturally arise from active engagement in the field (Piperata and Dufour 2016). Thus, her initial observations while living in Maroua led to the development of a formal research question for her master's thesis: how does the quality of drinking water change as it travels through the local water delivery system from treated municipal water from a deep aquifer to being stored in the home? To address this question, the CANARI team was assembled and included members of the DECML, a human biologist, and an expert in water microbiology. In the summer of 2013, water quality sampling of source, delivery container, and home

storage (canari) water, along with the administration of structured health surveys was carried out among a sample of 120 households in four Maroua neighborhoods. The team discovered that water from improved sources had relatively little contamination, but that contamination reached its highest level at the point of use: the canaries. Microbiological and molecular testing determined that a certain profile of drinking water contamination increased the risk of individuals reporting diarrhea disease during the previous two weeks, and there was evidence of fecal contamination from human, ruminant, and poultry sources in the water (Healy-Profitós et al. 2014).

At this point, the CANARI team decided to transition into applied research. We had pinpointed that most drinking water contamination occurred in the canari, so improving the canari was likely key to decreasing diarrheal disease incidence. Through her extended network, Garabed knew Carolina Gil, a professor at OSU's College of Design, who was familiar with the principle of human-centered design. Gil's design student, Michael Gundich, needed a senior research project. Through our Cameroonian network, we were able to arrange for a visual anthropologist, Mouadjamou Ahmadou, to film interviews with families about their canari and capture families interacting with their canaries throughout the day. Michael reviewed 486 digital videos of observations and

interviews to breakdown the various daily activities that involved water and the canari. He then used this information to design a prototype of an improved water storage device following the guidelines informed by previous fieldwork: the prototypes needed to maintain a similar level of aesthetic appearance, keep the drinking water cool, maintain good taste, and be created with local materials. The final result was two prototypes, one improved canari and one natural water filtration device (Figure 4 and Figure 5), which we hope to test in the field in the near future.

### Anthropological Contributions to One Health Research: Importance of Understanding the Cultural Context

Lastly, but perhaps most importantly, anthropologists provide key information on cultural dimensions and context that enhance both the level of understanding of the problem and the potential effectiveness of any intervention developed to solve the problem. As the One Health framework places emphasis on moving beyond an anthropocentric viewpoint when approaching health research projects, it may seem counterintuitive that anthropology's focus on the (human) cultural dimension adds benefit. It has been argued that the One Health framework tends to view the world as becoming increasingly similar as a result of globalization (Wolf 2015). Although globalization is indeed shaping the world and making certain aspects of it similar, it is not creating a world that will one day be completely homogenized. An ethnographic understanding of the local context, obtained through informants' unique viewpoints, is key to fully realizing a One Health approach. For example, although there are similarities in the biology and mechanics of how water becomes contaminated globally, the sociocultural and ecological forces that frequently govern biological processes vary widely from context to context. For example, secondary analyses of our CANARI fieldwork suggests that even within the same city, different neighborhoods may have different household drinking contamination pathways (Healy-Profitós et al. 2016)



Figure 4. Prototype 1 (Oasis Canari)

### Discussion

In summary, One Health projects can be, in many ways, anthropological projects expanded to include the viewpoints of other health sciences. Anthropologists can use a One Health framework to recruit researchers from other disciplines to study health problems enhances health research. Our research projects have benefitted from the influence of anthropology's

emphasis on long-term engagement, direct and participant observation, and attention to cultural context. Our work designing improved drinking water storage containers in Cameroon provides an example that both theory-driven and applied research can be done by the same group of interdisciplinary researchers.

Although there are greater institutional factors that play a role, the involvement of anthropologists in One



Figure 5. Prototype 2 (Oasis Purify)

Health research teams may help to bridge these interdisciplinary understanding gaps. Anthropology is focused on understanding the diversity of the human experience, and this human experience includes the various viewpoints held by different disciplines. Anthropologists are trained to facilitate greater understanding of different cultures, and different health science cultures are no different.

### Conclusion

In our experience, anthropology's involvement in One Health research promotes new and exciting research that moves all fields forward. We encourage anthropologists interested in health research to become more involved in the One Health approach, either through joining already existing One Health research groups or through inviting researchers from other backgrounds to join in the anthropologist's own research ventures using a One Health approach.

### Note

<sup>1</sup>Our research group's name is not an acronym but instead was inspired by the French name for the water storage containers used in the Far North Region.

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