

The purpose of going to Zambia this past Spring of 2026 was to collect baseline data for my thesis project. My thesis project encompasses a nutrition intervention aimed at increasing dietary diversity and reducing household hunger scores in the rural village of Kafue, Zambia. I am working with my advisor, Dr. Brittney Sly, who is the vice president of the nonprofit organization MIGHTi, which is committed to improving global health. This specific intervention aims to educate women to be health and agricultural leaders in their community. My thesis uses themes of the social cognitive theory (SCT), which is a validated way to assess and evaluate human behavior and the success of interventions by considering the roles of self-efficacy, observational learning, and the impact of the surrounding environment.

While in Zambia, I spent four days on the MIGHTi farm with the participant women, MIGHTi on-ground members, two translators, Dr. Sly, a CSU public health graduate student, and a CSU undergraduate nutrition student. 28 women in the Kafue/Mungu community between the ages of 18 and 70 years old were enrolled in the study and interviewed for baseline data. However, we recorded over 32 women participating in the focus group sessions on day 2, as well as the nutrition and health education and cooking workshops on days 3 and 4. On day 1, we conducted one-on-one interviews that collected demographic data and a 24-hour recall, captured SCT themed questions, household hunger scores, and questions that assessed food access and availability, such as where food came from (their own property/ farm efforts, purchased, bartered, etc.). We also recorded the kinds of foods grown, as most of the women grew at least one crop. The 24-hour recall provided information to calculate household hunger scores and diet diversity, which are validated tools used to assess dietary patterns in comparable Sub-Saharan African populations.

On day 2, we conducted a focus group session that expanded the interview questions but dove more into accessibility and barriers to adequate food and health outcomes. These questions highlighted SCT themes of beliefs and knowledge, outcome expectations, self-efficacy, and perceived environment. Through the one-on-one interviews on day 1 and focus groups on day 2, we learned that the women in this community are most greatly concerned about their financial situations. Secondly, they are concerned about the amount and variety of food that is accessible to them and their families, and the effect on their health. Many women reported experiencing at least three days of no food in the household within the last four weeks. Through the 24-hour recall from the one-on-one interviews, we found that most families consumed, on average, one to two meals a day that consisted of one vegetable (called “relish”- a term for a Zambian side dish) and nshima (national Zambian staple made simply of corn and water). The ability for these women to nourish themselves and their households properly is directly related to their financial situations, as well as their lack of consistent year-round water sources for farming. Consequently, this lack of diversity in their diet and overall lack of food directly impacts the health of them and

their households. During one-on-one interviews, one of the questions we asked inquired about the perceived health of the women and their families. Almost all the women answered that they and their households were not healthy due to lack of food.

Day 3 entailed a rural health workshop that included nutrition education pertaining to a balanced diet and infant nutrition, water, sanitation and hygiene (WASH), and fermented foods. This session was led by Dr. Sly and the other two students on this trip. The participants were provided with their own journals that contained the information discussed in the session. The participants then engaged in a cooking workshop that taught them how to make egg drop soup and fritatta, which introduced new cooking techniques with foods they already consumed and were available to them. Day 4 included a recap of the nutrition education discussed the day before, followed by an activity to test/solidify knowledge. The activity featured printouts of a variety of foods available locally that had to be sorted into three categories discussed during the nutrition education session: bodybuilding, health-protecting, and energy-giving. The women did a great job remembering the differences and purposes of the different foods. The participants then engaged in a fermented foods themed cooking workshop where they learned how to make pickled vegetables, sauerkraut, and yogurt. While we could not see the results of the fermented foods since it took over a day, it was reported that the women saw success with the fermentation, and they and their households enjoyed eating these new foods. The fourth day concluded our time with the participants for this trip, and we wrapped up the day with a ceremony that celebrated the women participating in the four-day MIGHTi workshop. While the recorded 32 women present at the workshops were the ones initially gaining education from the sessions, their households also benefitted from the new information and resources available to them.

There are many directions to what future sustainability of this project could look like. As stated, this project has the goal of decreasing malnutrition through nutrition education and access to mushrooms all year round. CSU engineering is in the process of creating a solar dryer that will be able to dry a large amount of mushrooms at once, so there will be increased quantity available. Eventually, the goal of the project is for the women enrolled in the study to grow mushrooms in their own homes, away from the mushroom site. Once they become masters of at-home grown mushrooms, they will then teach the other women in the community on how to do this. This will lead to increased diet diversity within homes, and eventually a way to provide income for families. Home cultivation of mushrooms is a rising practice in rural Sub-Saharan African communities and has been highlighted as a successful market. With increased income in the village of Kafue, Zambia, families will be able to afford other foods that will contribute to the overall increase in health of the household.

Since I will not be back in-country for some time, I am creating a nutrition intervention and food frequency questionnaire that will be carried out by on-ground members of the MIGHTi nonprofit. This will allow me to collect data while I am away that will be useful to my thesis. It is important that this data is collected between my trips, so that I can see if the nutrition intervention is working and see if there are differences in diet diversity at the end of the rainy season vs at the beginning of the dry season. Zambia's rainy season is generally from November

to April, so the baseline data I collected was at the very end of the rainy season/beginning of dry season.

Mushrooms are the chosen crop for this project because they are already a traditional food in Zambia that contain essential micronutrients, protein, and prebiotic fiber. Mushrooms require little land, water, and are not expensive to grow, which addresses the primary barriers that Kafue farmers face when growing crops to consume and sell. The market for culinary mushrooms across the country is robust, as they are both economically and culturally valuable. Similar projects in other Sub-Saharan African countries have seen great financial success with home grown mushrooms projects. This provides assurance that mushroom farming is a project that will eventually increase financial security and therefore increase access to diet diversity while decreasing household hunger scores within participating households in the Kafue population.

In my application, I noted that mushrooms are a high-quality source of protein, as 3 oz of raw mushrooms (about 1 cup) provides 1-2 g of protein; 100 g of dried mushrooms provide 20-30 g of protein. This was taken from a nutritional report done by a food science student in my department, but I believe the original statement was taken from the website MerryHill Mushrooms.¹ However, a scholarly source that contributes to this claim found that fresh oyster mushrooms have 18–19.15 g/100 g of protein content.² This study also found that oyster mushrooms dried in hot air had the highest protein content out of the other mushrooms tested; drying at 40 °C resulted in the highest protein content in oyster mushrooms at 30.8 g/100 g. This is exciting news, as outdoor sun drying is the current method that mushrooms are preserved among our intervention population. While protein is certainly an important part of the diet, our intervention does not necessarily focus on the protein aspect of mushrooms, but more so on the high micronutrient content that is hard to fulfill with the very limited diet our target population currently consumes.

I am immensely grateful for the generous donors through AWIN and The CSU Africa Center that helped fund my travel expenses, so that I was able to collect in-person data and experience such meaningful time among the Kafue community and the wonderful participants in my study. I am so excited to continue my work on this project and help make a difference in Kafue. The women of this population are full of hope, eager to learn, and excited about making the quality of life better for themselves and those around them.

Sources

1. Mushrooms A by: Merryhill. How Much Protein is there in Mushrooms. Merryhill Mushrooms. Accessed July 3, 2026. <https://www.merryhill-mushrooms.co.uk/blog/how-much-protein-is-there-in-mushrooms>.
2. Imane Moutia, Lakatos E, Attila József Kovács. Impact of Dehydration Techniques on the Nutritional and Microbial Profiles of Dried Mushrooms. *Foods*2024;13(20):3245-3245. doi:10.3390/foods13203245